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Contractors and Engineers Monthly

Vol. 44, No. 11 NOVEMBER, 1947 $3 a Year, 25 Cents a Copy

Covering the Field

Patterson Field Runway
Grading, drainage, aggregate production, batching, and concreting operations are covered in a 3-part article on page 1, with a picture story on pages 50-51.

Earth-Fill Dam
River diversion, abutment stripping, excavation, and earth-fill placing at Granby Dam are described on page 2.

Paving New Concrete Road
Three contractors replace a 17-mile section of the Lackawanna Trail. Heavy grading was involved (page 5).

AASHO Meeting
Speech and discussion topics of the state highway officials' annual meeting are covered in detail on page 17.

Hot-Mix Paving
As reported on page 25, 14 miles of asphaltic-concrete access highway marks the second major Garrison Dam contract.

Safety and Your Job
To lower your accident rate is to lower your operating expenses, an article on page [illegible] ints out.

County Road Work
This county buys the gravel for its gravel-road system, but handles it with its own machines and forces (page 33).

Dredging New Channel
A suction dredge digs a 9-mile drainage channel between two bayous in the Louisiana flatlands. See page 38.

Conveyor on Grading Job
Some 7,500 cars a day pass through a grading job, thanks to an overhead dirt conveyor. Details are on page 45.

Road-Base Construction
A new machine vibrated fines into a coarse-aggregate base. See page 48.
Dredged clamshell[illegible]ere laid to form a 10-inch base course. [illegible] page 97.

Three Bridges—One Job
There's a full account on page 52 of the construction of three bridges with steel-pile and concrete abutments.

Roadside Development
West Virginia reports (page 57) on its use of 2,4-D, with special Jeep-mounted sprayers, to eradicate weeds.

Plant-Mix on River Banks
Hot asphaltic plant-mix was dumped under water in 300-ton loads to protect scouring river banks (page 62).

New Highway Tunnel
Rock disposal plagued a contract to bore an 880-foot tunnel through a granite mountain. Story on page 73.

Winter Maintenance
Even this Southland state is prey to ice and snow, but it uses rock salt and truck plows advantageously. Page 78.

Care of Equipment
Read on page 82 how a mobile lubrication and fuel rig and two field shops keep Granby Dam equipment moving.

(You will find "In This Issue" on page 4)

Five Pavers Build 10,000-Foot Runway

Project Set Up to Lay 21 and 25-Inch Concrete At Patterson Field, Ohio; Grading and Drainage

By WILLIAM H. QUIRK,
Eastern Editor

(Photos on pages 50 and 51)

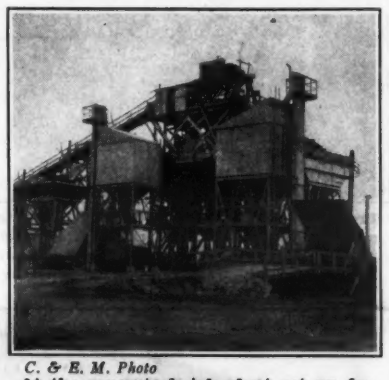
✦ BIG planes require big runways; big in length, width, and thickness of pavement. That is why the U. S. Army Air Force is building one of the world's greatest runways at Patterson Field, Ohio, for the B-36, the world's largest land-based bomber which made its maiden flight on August 8, 1946, at Fort Worth, Texas. The dimensions of this new concrete runway are on the superlative side. It is 10,000 feet long x 300 feet wide and 21 inches thick. The paralleling taxiway is 8,000 feet long x 150 feet wide and 25 inches thick.

The 4-inch extra thickness is built into the taxiway and warm-up area because that is where the greatest stresses will occur. As the huge planes taxi slowly along, or stand with locked wheels while their engines are gradually warmed up, the pavement will be subjected to great internal stresses from the intense vibration. In comparison, the impact loads on the runways from landings and take-offs are considerably lighter. Steel forms were specially designed and built to hold the heavy masses of concrete true to line and grade during the construction.

Most of the grading was done last year. But the laying of concrete, which is being handled by five pavers, started on June 19, 1947, and the completion date is scheduled for December. The W. L. Johnson Construction Co. of Columbus, Ohio, is doing the work for a contract price of $4,059,940. Supervision of the construction is exercised by the War Department, Corps of Engineers, Louisville Engineer District with headquarters at Louisville, Ky.

Patterson Field lies east of Wright Field at Dayton, Ohio, and already has a triangular layout of concrete runways. Portions of all three runways have to be taken up to make way for

(Continued on page 22)



C. & E. M. Photo
At the concrete batch plant set up for the Patterson Field job are four 100-ton 2-compartment aggregate bins.

Aggregate Production and Batching Are Organized on Large Scale to Furnish Concrete for Runway Paving

✦ THE new 10,000-foot concrete runway and 8,000-foot taxiway at Patterson Field require 535,610 tons of aggregate. All this material is being supplied by the Central States Construction Co. of Crosby, Minn., from a 220-acre gravel "pit" located just north of the field. This same company acquired the land when it furnished aggregate for the original construction at the field. For this job, however, a complete new plant set-up was installed with a capacity of 400 tons of sand and gravel per hour.

The material has a high limestone content, imparting a toughness of structure not common to most gravels. At the plant the gravel is washed, crushed, and screened into three different sizes for coarse aggregate. Furthermore, a portion of the fines is processed further to produce a blend of sand conforming to the sand specifications. Before the

(Continued on page 69)

Paver Team Averages 300 Cubic Yards of Concrete Placed Hourly on Runway For Latest Giant Bomber

✦ CONCRETE-paving operations for the new runway and taxiway at Patterson Field, Ohio, started at the center of the seventh of the twelve 25-foot runway lanes (the numbering starts on the north side of the runway) and continued to the east end. This strip was paved by four Koehring 34-E Twinbatch pavers, two on each side of the forms.

However, the arrangement did not turn out very well, as the working space was too restricted for the four big pavers to operate at peak efficiency. Accordingly two of the pavers were moved off the field and set up at a central mixing plant from which the mixed batches are hauled to the forms. The contractor then added another similar paver to this plant and thus has five pavers, all told, working on the job.

Paving Plant

The central paving plant is located a little over ½-mile from the batch plant in the direction of the runway. A concrete roadway was first constructed 120 feet long x 12 feet wide x 7 inches thick. Along one side of this strip a trench 2 feet deep was dug, into which precast concrete wall slabs were set. The slabs are 10 feet long x 6 feet high x 7 inches thick. More concrete was poured into the trench around the junction of the wall and road slab for additional strength. Backfill was placed in the rear of the projecting 4 feet of wall to support the pavers.

The discharge buckets are run out to the ends of the paver booms which are held up by timber frames. From 5 to 8 batch trucks of the total fleet are assigned to feed raw materials to these central pavers, while the others haul to the pavers out on the field. The latter haul varies from ¼ to 1½ miles.

The wet batches are hauled, two to a truck, in an average of 6 trucks equipped with high steel watertight bodies. The pavers discharge the concrete from the drums directly into the trucks as they move down the concrete road strip, passing under the booms of the big pavers.

Each of the pavers, both at the central plant and in the field, was at first supplied with water from a 1,200-gallon tank truck. This set-up was later improved upon at the plant by installing a large water tank from which the pavers drew. Water is probably the least of the contractor's problems—as far as a supply for the concrete is concerned. Heavy rains of the spring and summer saturated the gravel stratum underlying the field so that it was necessary only to dig a hole from 7 to 8 feet deep to obtain all the water needed. Two such holes were made, and from these a Jaeger 4-inch centrifugal pump fills 3,000-gallon tanks. The tanks are

(Continued on page 85)

CONVEYOR MOVES DIRT OVER HEAVILY TRAVELED ROAD

C. & E. M. Photo
This big conveyor built by Clyde W. Wood, Inc., carries dirt across U. S. 99 north of Castiac, Calif., and dumps it to waiting haul units, while a traffic count of 7,500 vehicles per day flows underneath it. Below it in this picture is the Caterpillar 85-kw portable generating set which drives the conveyor motors. You will find a description of this 700,000-cubic-yard grading job on page 45.

Granby Dam Job Forges Ahead Despite Snow and Short Season

Colorado River Diverted And Abutments Stripped In Spectacular Display Of Heavy Equipment

By RAYMOND P. DAY,
Western Editor

✦ DESPITE snow, adverse weather, and a short working season, Granby Constructors are rapidly pushing work on Granby Dam, located 8,000 feet high in the Colorado Rockies near the resort town of Grand Lake. With the diversion of the Colorado River a reality, stripping of overburden and waste rock is well under way.

Granby Dam is one of the new key links in the Colorado-Big Thompson irrigation and power-development project engineered by the U. S. Bureau of Reclamation. When it is finished, at a contract cost of $5,969,000, the big dam will store Colorado River water 100 miles northwest of Denver for use on the eastern side of the Continental Divide.

Water from Granby Reservoir will be pumped by the new Granby Pumping Plant, also under construction by Granby Constructors, to a canal which will lead to Shadow Mountain Reservoir. From that point the water will pass through the famous 13-mile-long Alva B. Adams tunnel under the Continental Divide, and through the system of tunnels and power plants near Estes Park, before it is used for irrigation in eastern Colorado.

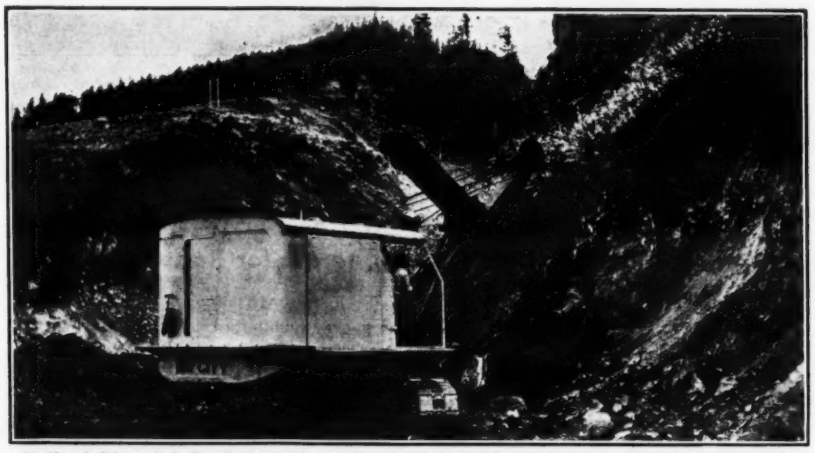
Granby Constructors is a joint venture composed of the Ed H. Honnen Co., Peter Kiewit Sons' Co., Martin Wunderlich, Grafe-Callahan Construction Co., Brown & Root, Inc., Condon-Cunningham, and Gunther & Shirley Co. The firm started work on August 6, 1946, with 1,300 calendar days allowed for completion of the big project.

Dam Is Earth-Fill Barrier

Granby Dam is to be an earth-fill barrier about 1,000 feet long at the crest, 230 feet high above stream elevation, 1,400 feet wide at the base, with a 40-foot-wide roadway on top of the finished structure. Two concrete cut-off walls, 125 feet apart and 20 to 51 feet high above the rock, are to be constructed in the cut-off trench, converg-

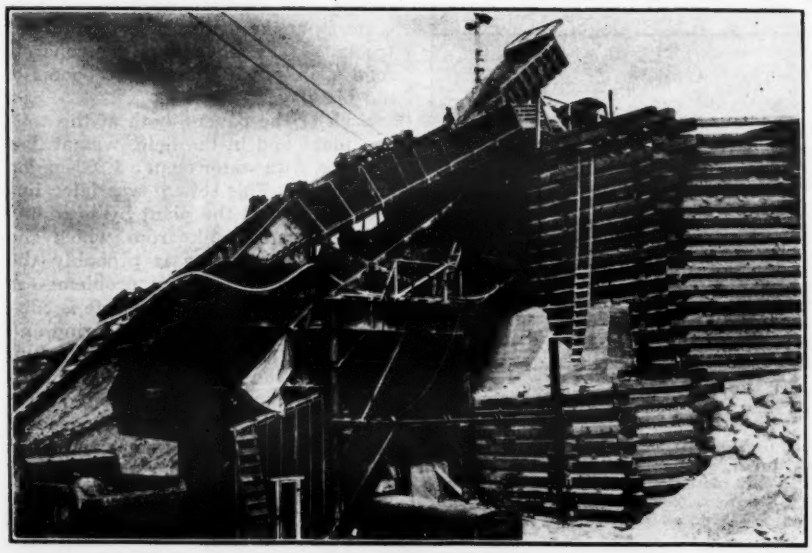
(*Continued on page* 12)

From the left abutment at Granby Dam site we see a Lima dragline, a bulldozer pushing material towards it, and the first earth-fill plug being processed in the right background. In the far background is the future reservoir area. This and following photos are reproduced courtesy of Granby Constructors.



Both right and left abutments required considerable stripping. This Bay City machine, rigged as a shovel, did some of the early abutment stripping at the bottom.

At the borrow pit this Lima 1201 shovel loads a 15-yard Euclid with earth-fill material for the screening plant.



Here is the screening plant as first set up for the job by F. W. McCoy Co. This season it was planned to increase its size and install reciprocating feeders to take care of the peculiarly heavy stubborn pit material.

First Earth-Fill Material Is Dug From Borrow Pit, Run Through Classifier, And Processed on Dam

✦ THE placing of rolled-earth fill in Granby Dam, halted in late November, 1946, by excessive frost conditions, was resumed this season and is picking up in volume as rapidly as excavation will permit. Granby Constructors is now placing daily about 5,000 cubic yards of impervious material along the upstream toe of the dam adjacent to the right abutment.

The production of rolled-earth fill is dependent largely on twin screening plants set up about 800 feet from the main borrow pit. These two plants are designed to receive the pit-run material, separate the minus-3-inch particles from the bigger material, and deposit the classified two sizes of earth into separate bins.

The borrow pit is overloaded with large boulders, some of which are bigger than a cubic yard in size, so the shovel does a lot of selecting in the pit to prevent the large stones from entering the classifier and slowing it down. Even so, the material is so heavy that it is extremely hard to pick up and feed onto the screens.

Last season the classifying plant consisted only of a single feeder and screening set, but this season the set-up was increased in size.

Screening-Plant Set-Up

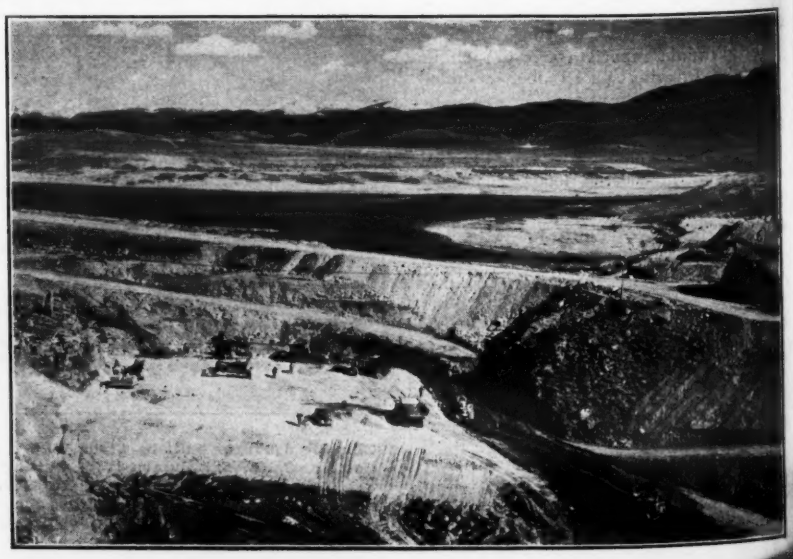
The first plant set-up was built especially for the job by F. W. McCoy Co. of Denver. It consisted of a receiving hopper housing a scalping grizzly, with rails set to remove all plus-6-inch rock. This oversize rock rolled on down to a 20-cubic-yard rock-storage bin.

A Pioneer 4 x 10-foot vibrating screen was then used to separate the minus-3-inch material, which dropped down to a 20-cubic-yard earth-storage bin which served the Euclids hauling impervious fill material. This screen was fed by a vibratory feeder.

On account of the peculiarly heavy, stubborn characteristic of this material, however, trouble developed in feeding. A study was made, and a much larger vibratory feeder was installed. The

(*Continued on page* 93)

This picture of earth-fill processing shows Euclids dumping their loads, a bulldozer-scarifier working the material, and the big McCoy-built sheepsfoot roller compacting it. In the background is the protective cofferdam.

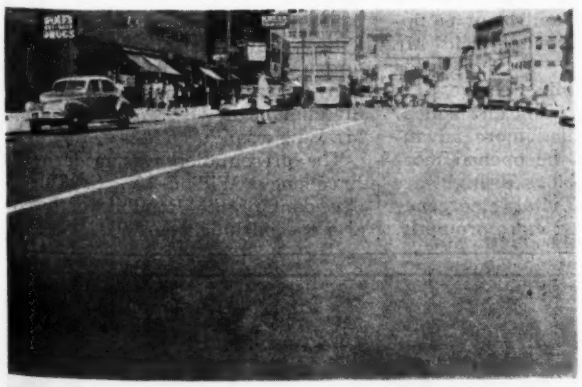


"As easy as icing a cake....."

Newspaper reporter's description of speed and precision with which new Texaco Asphalt paving was laid over old Elizabeth, N.J., streets.

Laying a new Texaco asphaltic concrete wearing surface on one of a number of old, rough streets in Elizabeth, N.J.

BEFORE: The old pavement on Broad Street, Elizabeth, was rough on motorists and unsightly.



AFTER: The new Texaco asphaltic concrete surface is smooth, resilient, rugged—a welcome improvement to motorists.

This year, the city of Elizabeth, N.J., tackled its biggest street improvement program in many years. Fourteen worn, rough sections of important arterial streets were scheduled for resurfacing, including Broad Street, the city's busiest thoroughfare.

Elizabeth chose a fine-graded Asphaltic Concrete pavement for its streets. Dense, rugged and resilient, this plant-mix type of asphalt construction will stand up under years of hard wear with a minimum of maintenance.

Depending upon the condition of the old street, from one to three courses of Asphaltic Concrete were employed. Texaco Asphalt Cement, with a penetration between 60 and 70, has been used almost exclusively by the contractors, the Standard Bitulithic Company and the American Paving Corporation, both of Newark, N.J.

Elizabeth is one of 1,500 representative U.S. cities which have paved with resilient, lasting Texaco Asphalt during the past 40 years.

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Edgar J. Buttenheim, President
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AASHO Studies Urban Traffic Firsthand

Delegates to the 33rd annual meeting of the American Association of State Highway Officials, which was held in New York City in September, enjoyed a rare experience: first they heard an able panel discussion on one of the major problems confronting highway officials today; and then they were shown what the country's largest metropolitan area is doing to overcome that problem. The problem is urban traffic. And few are the highway departments which are not already bedeviled by it. If some now consider themselves immune it is only wishful thinking, for their blissful aloofness can hardly last.

This problem of traffic-clogged arteries of travel in urban centers can no longer be shrugged away as a municipal affair and of no concern to state highway engineers. As Governor Thomas E. Dewey of New York said in his welcoming address:

"The day has passed when the state or national government can build great highways up to the borders of cities and then dump an enormous traveling public onto narrow city streets to fend for themselves. That practice has created great bottlenecks in the cities, congested their streets, depreciated their land values, and by the congestion impaired the usefulness of the highways themselves. It is for that reason that the State of New York—and many of your states—have taken over responsibility for continuing great arteries of transport through the hearts or around the edges of our cities."

Seldom are concrete examples to illustrate a point produced as sharply and clearly as they were by those who arranged the AASHO section covering urban traffic problems.

On the day following an intelligent discussion and analysis of this urban traffic problem, the delegates took a 110-mile auto trip through New York City and Long Island. On the two following days they traveled through the adjoining state of New Jersey on the west, and through Westchester County to the north. There they saw—not on a map or blueprint, but in solid concrete, steel, and stone—the parkways, expressways, tunnels, and bridges they had heard about in the discussion. They saw traffic flowing smoothly in, around, and through this great metropolitan area on multi-lane pavements, interchanges, and other structures. It was an object lesson and a graphic example of theory in action, that will not soon be forgotten by those fortunate enough to observe it.

But the urban traffic situation in New York is far from perfect. Even with an efficient police escort clearing the way, the delegates were aware of serious traffic congestion once they had left the smooth-riding, limited-access thoroughfares, free from stop lights and intersections, to enter the crowded city streets. They saw that cross-town traffic in Manhattan is something to give shudders to the motorist. They learned that there is no way to cross from the East to the Hudson Rivers except by inching along bumper to bumper, block by block.

They also saw startling contrast in traffic movement when they left the modern, elevated Gowanus Parkway in Brooklyn to worm their way through the old, narrow, winding, crazy-quilt pattern of streets leading to the Brooklyn Bridge. This link in the parkway chain is now under construction and will eventually tie in to the new Brooklyn-Battery Tunnel.

As for the tunnel itself, Robert Moses, City Construction Coordinator, told the delegates that if a bridge had been permitted at that location it would be completed now and at half the cost of the tunnel. Moses, probably the greatest planner and doer of this era in the field of urban highway transportation, spoke frankly of the "asinine decision of the War Department" which opposed a bridge on the theory that there should be no span seaward of the Brooklyn Navy Yard. Yet two suspension bridges, the Brooklyn and the Manhattan, have for years spanned the East River below the big Naval station. Such is an example of the opposition that urban highway planners sometimes meet and which they cannot always overcome. In this case the compromise on the tunnel was costly and time-consuming.

The outspoken Moses also called attention to two major flaws now present in the parkway system. Possibly these might have been overlooked by the delegates, as the trips were made on weekdays when traffic was comparatively light. On crowded week ends they are all too obvious.

One is the Bronx River Parkway, forerunner of this type of highway construction. Completed in 1925, it was beautifully landscaped along its sharply curving alignment, and spanned by numerous ornamented bridges carrying cross traffic. Twoscore years ago it was a marvel; today it is a menace. Its snake-like windings, designed to relieve monotony, now invite accidents as cars wander all over the pavement. As Commissioner Moses pointed out:

"Today this artery, although still indispensable, is so obsolete that the State and local authorities are confronted with two tough alternatives: tearing out all the short and narrow bridges and realigning the roadway, or finding an entirely new parallel relief route."

The other example of costly shortsightedness is Grand Central Parkway where three major arteries of traffic pour into this overcrowded four-lane route to Long Island. The resulting week-end traffic jams are appalling. Moses foresaw this situation, but in 1929 he was up against a City Comptroller who did not. As he explained it, "This ribbon of land was far too narrow, simply because, as the State's representative, I could not make the City Comptroller understand the traffic jam which was almost upon us. As a result we have four lanes where there should be six, and skyrocketing values have made any widening unthinkable."

Highway officials should have learned a lot from their glimpse into the urban traffic problems around New York. From listening to Robert Moses they know that they can expect plenty of opposition from narrow, shortsighted interests or pressure groups before they overcome those problems. However, they should be stimulated by their look at what New York is doing to keep abreast of its urban traffic problem, to keep it from getting too far out of hand as it has in so many large urban areas.

The picture is far from perfect but progress is consistently in the right direction. Commissioner Moses has managed to keep politics out of what is essentially an engineer's problem. Working in administrations of varying political faith in both state and city governments, he has produced amazing results. The AASHO visiting delegates were treated to an excellent example in the urban traffic field on which to set their own sights.

Radio Valuable Aid To Road Departments

Better road service for the motoring public will be possible through broader use of two-way radio-telephone, according to W. Bruce Chilson, Chairman of the Radio Committee of the American Road Builders' Association, and Superintendent of Highways, Chautauqua County, N. Y. As a result of testimony by Mr. Chilson and others, the Federal Communications Commission has allocated six usable radio frequencies to highway departments.

Most of the publicity given to this type of equipment has emphasized its more spectacular uses—for trouble-shooting in times of severe stress; for dispatching crews and equipment to clear up heavy and unprepared-for storms; and other emergency measures.

However, it should not be forgotten that it can also serve to improve the overall efficiency of highway maintenance. The use of two-way radio-telephone will be reflected in lowered maintenance costs, greater flexibility of work, more efficient control of equipment units and personnel, said Mr. Chilson.

The motoring public receives the greatest benefit from radio, he added: detours can be handled more advantageously; roads can be opened more quickly; and snow-blocked highways that could hold up vital emergency services can be cleared more promptly.

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Food Packages Give Aid To Destitute Europeans

UN and government reports from abroad predict that the coming winter will be even more severe than the last. So this Christmas, many Americans will want to share their good fortune with friends, relatives, and the needy abroad by sending them a package through an organization known as CARE. It is a non-profit Government-approved agency, whose main offices are located at 50 Broad St., New York 4, N. Y.

CARE has prepared many types of packages, ranging from 22 pounds of standard foods and special baby-food packages, to cotton, household, blanket, and knitting-wool packages.

Just mail your order, with $10.00, plus the name and address of the person to whom you wish the package delivered. If you do not have the name of an individual, you may designate the classification of individual you would like to help: a displaced person, an orphan, a member of a religious group, etc. The food package contains 41,000 calories—enough food to supplement regular family rations for a month.

Harbor Builders Honored

In recognition of their services in the construction of the new harbor at Monrovia, the Liberian Government has conferred the grade of Grand Commander with Star, Order of Star of Africa, on Commander W. K. Trimble, (CEC) USN, Officer in Charge of Construction, and Harry A. Lutz of the Raymond Concrete Pile Co., heavy-construction contractor of New York City was awarded Knight Commander, Order of Star of Africa. The company constructed the harbor under the direction of the U. S. Navy Department. Mr. Lutz was Works Manager.

The presentation was made by His Excellency William V. S. Tubman, President of the Republic of Liberia, at a special luncheon.

Virginia Dept. of Highways Photo

Virginia's first three-level under and overpass will relieve a serious traffic bottleneck at the intersection of Routes 13 and 460 in Norfolk County, and provide the final link in a four-lane by-pass around the city of Norfolk. This drawing by artist Francis Wiley Powell shows the various levels above and below as well as on a level with the tracks of the Norfolk and Western Railroad. The project, scheduled for completion next year, is under contract to E. W. Grannis Co. and Lewis & Bowman Co., Fayetteville, North Carolina.

Three Contractors Build Concrete Road

Heavy Grading Included For 16.8 Miles of 3 and 4-Lane Pavement Through Mostly New Location

• ONE of the major construction projects in Pennsylvania in 1947 is the rebuilding of the Lackawanna Trail from Tannersville north to a point above Tobyhanna, a distance of 16.8 miles. This road through the Pocono Mountains in the eastern part of the state is known as U. S. 611 on the maps. It is subject to two very different types of heavy traffic—tourist or resort travel and coal hauling. When completed next year, the new highway will be part of a 44-mile stretch of safe, wide pavement between Scranton in the coal fields and Stroudsburg near the New Jersey line.

The 8-mile section from Stroudsburg north to Tannersville was completed in 1942. But because of the war-induced shortage of steel the three lanes of concrete were paved without reinforcing. North of the present improvement the remaining distance to Scranton is also paved with concrete three lanes wide.

The section in between now being replaced was about 25 years old. It consisted of concrete pavement, 6-8-6 inches in depth and from 18 to 20 feet wide, marked by sharp curves and poor vertical alignment. The old concrete was also badly cracked and uneven in surface, and patches were commonplace. Portions of the road had been widened a couple of feet on each side with bituminous material. However, the increasing heavy traffic demanded a new road with better alignment, wider section, and thicker pavement.

Over all the new work the pavement is at least three lanes wide. On curves or where sight distances are less than 1,300 feet, four lanes with divisor strips are the rule.

The big project involves nearly 1,000,000 yards of grading. It was divided into three parts, with a different contractor working on each section. A 5.8-mile contract covering the distance between Tannersville and the town of Mt. Pocono was awarded by the Pennsylvania Department of Highways to C. W. Good, Inc., of Lancaster and Reading, Pa., on its low bid of $1,545,096. Work on this section started in May, 1946, and was scheduled for completion this autumn. The details of the work involved on this contract are the subject of this article.

Adjoining this contract to the north is a 3.9-mile section on which work was started in April, 1946, by the G. J. Packey Co. of Mt. Vernon, N. Y., for a contract price of $606,000. On this job Fred Berlanti & Son, Inc., of Harrison, N. Y., is doing the paving which also will be completed this year. Both these contracts included grading and paving with 9-inch uniform-depth concrete slabs.

Longest of the three contracts is the 7.1-mile section on the north end of the project. This work was given to George M. Brewster & Son, Inc., of Bogota, N. J., on a bid of $1,463,556, and the job got under way in May of this year. It will be finished early next year and will have a 10-inch uniform concrete pavement, the thicker depth of slab having been generally adopted by Pennsylvania during this past year. The pavement on this section will be laid on a special granular sub-base 8 inches thick.

Grading the C. W. Good Contract

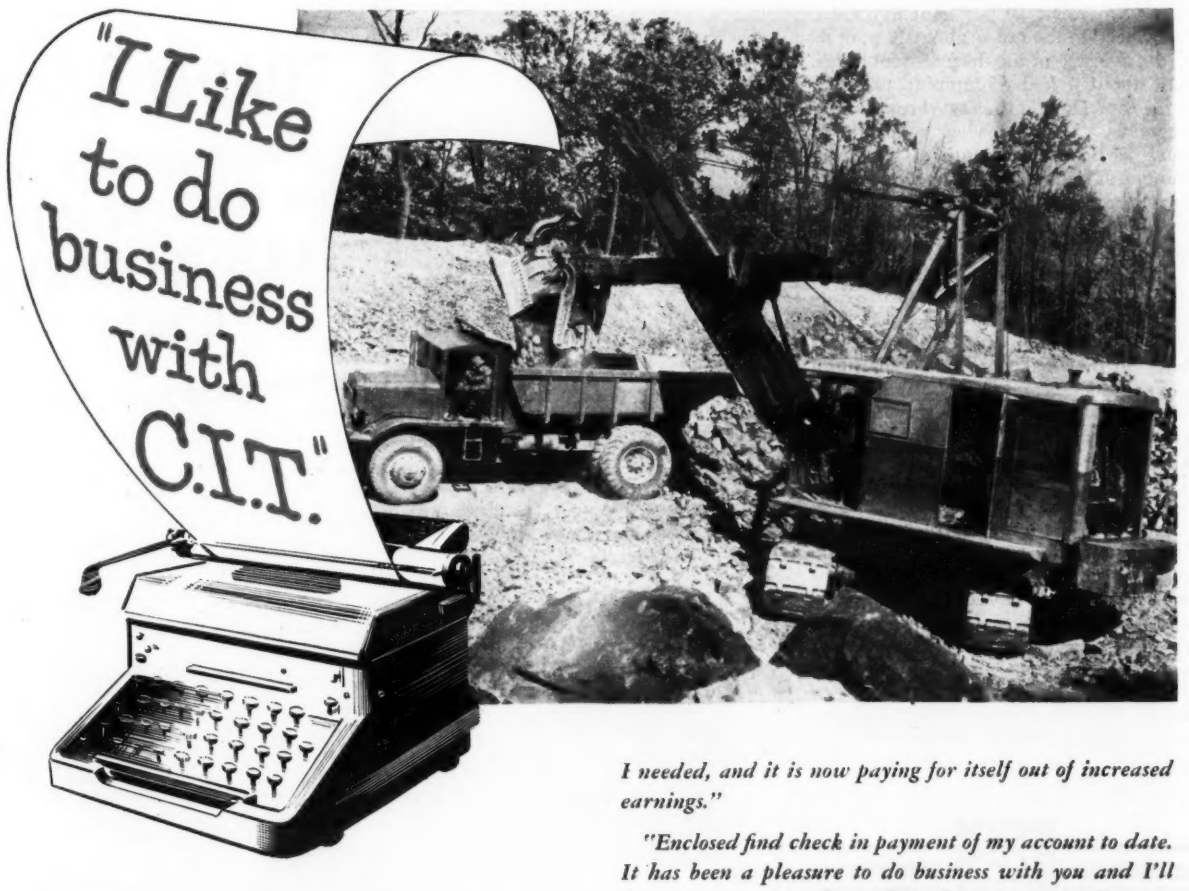
From May, 1946, to January, 1947, when the weather halted operations, C. W. Good, Inc., completed the bulk of the grading on the lower 5.8-mile section. It also finished about 50 per cent of the paving. A large rock cut where the lines of the old and new roads coincide was left untouched last year so as not to interfere with traffic over the old road during the winter. Through traffic now is detoured for the most part over parallel roads to the east.

The earth-work item was unclassified but about two-thirds was rock and the remaining one-third earth. No borrow was necessary as the cuts and fills balanced. But a small amount of waste occurred when the old pavement was removed in certain areas where the new line crossed it. In such instances the excess material was used to widen the fills or dumped into low spots along the road.

C. & E. M. Photo
A Northwest 2½-yard shovel loads a 12-yard end-dump Euclid with about 8 yards of rock from a big rock cut on the C. W. Good contract in Pennsylvania.

Until rock was reached, the overburden was moved with scrapers for the most part; the contractor employed a fleet of six LeTourneau 12 to 14-yard Carryalls pulled by Caterpillar D8 tractors. When rock was met, ten wagon drills were moved in on the job and worked there from the middle of June, 1946, until the end of July on a 24-hour

(Continued on next page)



MR. CONTRACTOR: Our files contain records of case after case where concerns have increased both their business and their earnings by using C.I.T. dollars to purchase machinery and equipment. And in every case, our clients conserved their own funds for operating purposes by making only a moderate initial investment.

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Three Contractors Build Concrete Road

(*Continued from preceding page*)

basis. Of these, seven were Ingersoll-Rands and the other three were Clevelands. Air was supplied by four Ingersoll-Rand 550-cfm compressors and three Schramm 325-cfm compressors. The wagon drills employed I-R 1¼-inch round steel in 4, 8, 12, 16, and 18-foot lengths, starting with 3-inch bits and dropping down by quarters to a 2-inch size.

In drilling the shallower lifts and for secondary blast holes, 6 jackhammers were used—2 Ingersoll-Rands, 2 Thors, and 2 Clevelands. A couple of portable Schramm 125-cfm compressors supplied air for the jackhammers. They used 2 and 4-foot lengths of 1¼-inch round steel with 1¾ and 1½-inch bits. Timken bits were used throughout.

The blast holes were drilled in the blue rock on an average of 5-foot centers. About 125 holes were shot at a time. American 40 per cent dynamite was placed in the holes, about 17 pounds on the average in the deep 18-foot holes, with about 5 feet of tamping material at the top. During the resort season, the secondary blasting was reduced as much as possible because of the large number of vacationists in the area. The larger boulders were then broken up on the fills by means of 2,500-pound balls dropped from cranes.

Three Northwest shovels, a 2½, a 2, and a 1½-yard model, handled the digging at an average rate of 1,000, 800, and 600 yards respectively in a 10-hour day. On the rock work two end-dump 12-yard Euclids and eight bottom-dump Euclids of 16 yards did the hauling, which averaged 1,500 feet. The bottom-dumps were also used on earth hauls along with eight International trucks carrying 8 yards each.

On the fills three D8 tractor-dozers leveled off the material, which was rolled by five 3-wheel 10-ton rollers—two Galions, two Hercules, and a Buffalo-Springfield. Final dressing, shaping of slopes, and maintenance of haul roads was carried out by three motor graders—two Adams and a Caterpillar No. 12. With both scrapers and shovels, an average of 4,500 to 5,000 yards was excavated in a 10-hour day. The dirt was placed in 4-inch lifts and the rock in 12-inch. But when the rock reached the top of the fill the final 6 inches of material had to be earth.

C. & E. M. Photos

About two-thirds of the excavation on the C. W. Good Lackawanna Trail contract was rock. In the first photo, wagon drills work in a rock cut—three Clevelands at the left, an Ingersoll-Rand at the right, all driven by the two I-R 550-cfm compressors shown. In the other photo a Thor jackhammer drills a boulder for secondary blasting. A Schramm compressor furnishes air.

The roadbed varies from 49 to 68 feet wide, depending on whether three or four lanes of pavement were being constructed. In the cuts the shoulders are 8 feet wide, and 10 feet wide on the fills; they slope ½ inch to the foot in fills and 1½ inches per foot in cuts.

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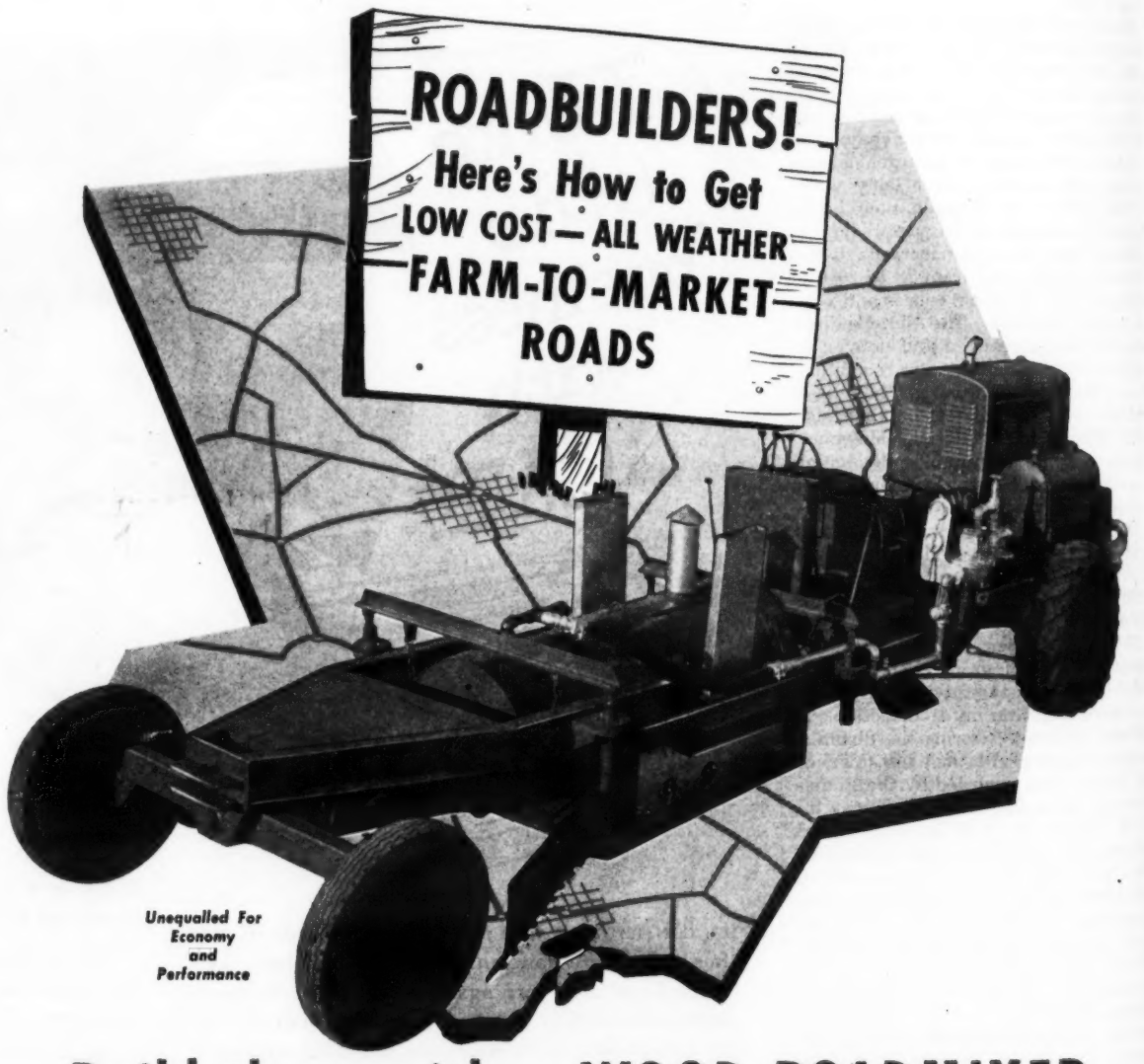

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Both cut and fill slopes are 1½ to 1, except in the solid rock cuts where a ¼ to 1 ratio is held sufficient.

Road Drainage

Road drainage included the building of seven good-sized reinforced-concrete structures of the following types and dimensions:

8 x 11-foot box culvert, 132 feet long
18 x 25-foot box culvert, 112 feet long
20 x 28-foot box culvert, 156 feet long
20-foot span bridge, 64-foot clear roadway
26-foot span bridge, 50-foot clear roadway
30-foot span bridge, 64-foot clear roadway
10-foot span arch, 142 feet long

In addition, the contract also included nearly 8,000 linear feet of reinforced-concrete drainage pipe from 12 to 30-inch diameter, and over 1,000 feet of corrugated-metal pipe of 24 to 48-inch diameter. The greatest amount of pipe of any one type, about 25,000 feet, was the 4-inch tile underdrain. This was laid 2 feet off the edge of the pavement at an average depth of 30 inches, with open joints covered with 24 inches of crushed stone.

Soil tests indicated that the subgrade provided for the pavement consisted of a good mixture of pervious material. So no insulation or blanket course was required as a foundation for the concrete slabs. However, crushed-stone lateral drains were constructed in the subgrade on the high side of each expansion joint.

These drains were installed by digging a shallow ditch, 6 inches deep and 15 inches wide, into the subgrade, and filling the trench with ¾-inch crushed stone. At the inlet or higher end the ditch is 4 feet from the expansion joint and cuts diagonally across the subgrade to a point about 2 feet above the joint at the outlet end. These French or crushed-stone drains run out through the shoulder to empty into either the tile underdrain or the road ditch.

Paving Preparations

As the heavy grading was completed, a Rome motor grader shaped the subgrade, getting it in readiness for the paving machinery and equipment. A total of 4,000 feet of Heltzel 9-inch steel forms was provided by the contractor. The usual procedure was to set out a 1,600-foot double row of forms, correct to line and grade, before paving was started. Form trenches were cut by a Cleveland Formgrader and a form crew of 16 set the forms on line, inserting the 24-inch form pins into the holes. The driving was done with an Ingersoll-Rand air gun powered by a Schramm 105-cfm compressor.

A Galion 10-ton 3-wheel roller then compacted the subgrade before a Buckeye R-B Power Finegrader removed the excess dirt, throwing it out on one side of the forms. The Finegrader moved itself forward on cables anchored to the forms ahead.

Two men with shovels followed, doing whatever cleaning up was necessary and pulling along a Cleveland scratch template to check the grade. Two others with hand shovels then dug the trench for the lateral crushed-stone drain, put in the stone, and covered it with a strip of lightweight tar paper, 3 feet wide. The purpose of the tar paper was to prevent grout from the concrete entering the drain and thus

C. & E. M. Photos

At left, workers on the C. W. Good contract set up an expansion joint of Flexcell asphalt-impregnated felt in a Bethlehem Steel Co. assembly. They are also erecting a wooden bulkhead to the left of the joint, as work is about to be finished for the day. At right, a Rex 34-E dual-drum paver places concrete pavement, while a Blaw-Knox paddle-type spreader levels off the concrete.

hindering the passage of water from the subgrade to points beyond the pavement.

The trench preparers were followed by a crew of four pulling along another Cleveland scratch template as a final check and making any necessary adjustments. The teeth on this second template were set at 8⅞ inches, and any marks that were made were erased by shovels skimming the surface. A final

(Continued on next page)

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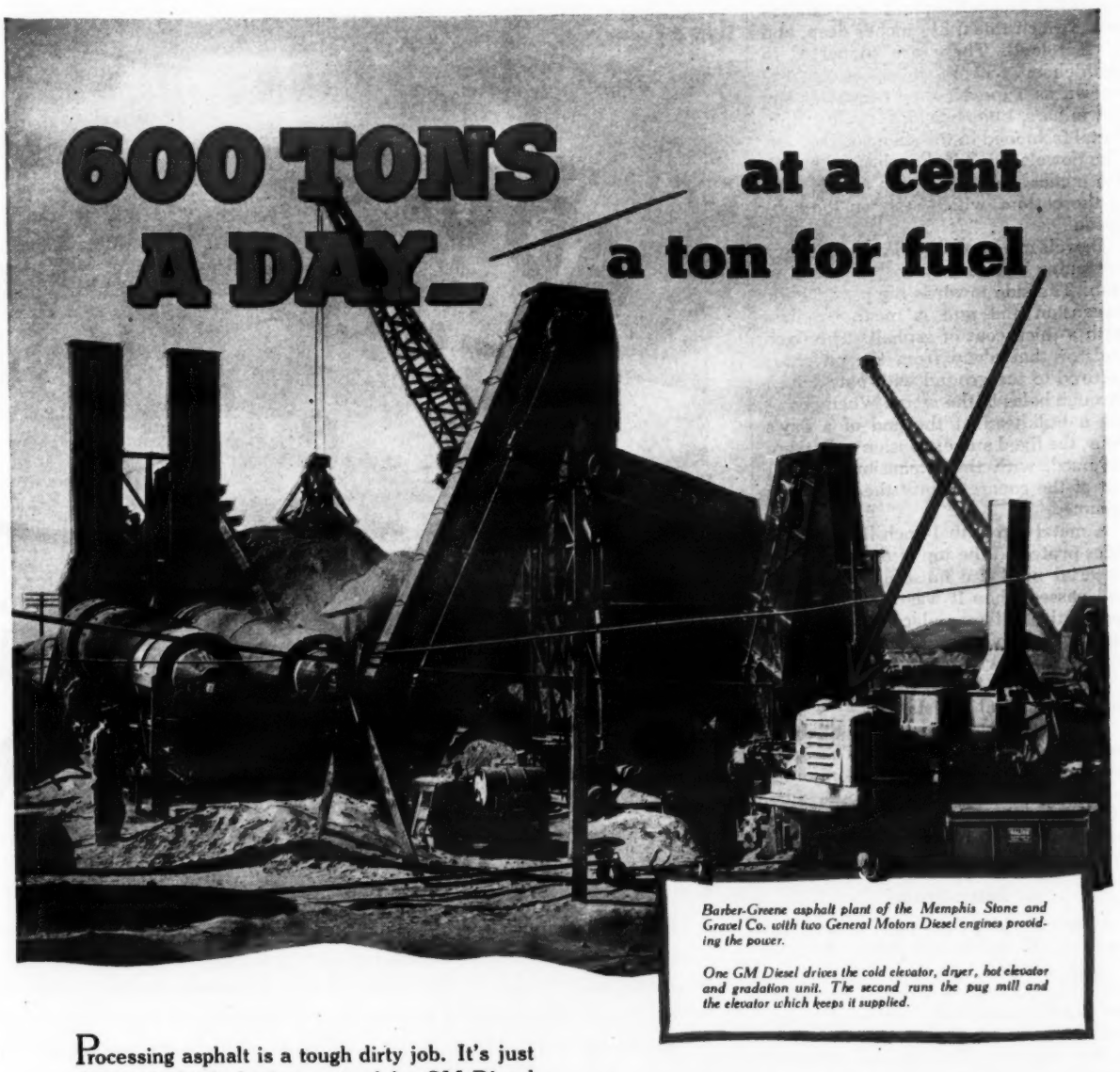

Barber-Greene asphalt plant of the Memphis Stone and Gravel Co. with two General Motors Diesel engines providing the power.

One GM Diesel drives the cold elevator, dryer, hot elevator and gradation unit. The second runs the pug mill and the elevator which keeps it supplied.

Processing asphalt is a tough dirty job. It's just the kind of job that's a natural for GM Diesel power. GM Diesels can take a beating, keep steadily on the job, and all the while deliver power at exceptionally low cost. In this case on the Barber-Greene asphalt plant, at 1¢ a ton for fuel.

Being 2-cycle with power at every downstroke, GM Diesels are compact and can go to work in places where Diesels couldn't be used before. They're easy starting, need little attention, and are quick to respond to varying loads.

Construction men everywhere are astonished at the money GM Diesels save them. It's sure worth looking into. Let us know and we'll send along all the facts and details.

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DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Three Contractors Build Concrete Road

(*Continued from preceding page*)

rolling was done by a Fordson 5-ton 3-wheel roller.

With the subgrade in shape, the joints were then installed by a 4-man crew which carried its materials and tools along on a 4-wheel bridge. Expansion joints were placed at 123-foot intervals with contraction joints set halfway between. On the 4-lane pavement the concrete was laid in two 22-foot slab widths which are separated by a 4-foot divisor strip. The divisor consists of 8-inch-thick curbs sloping back 15 inches, enclosing an 18-inch plain-concrete strip. This type of construction stretches over all the job with the exception of a 3-lane section, slightly over a mile long, near the south end of the project. This permitted most of the paving to be done for a 22-foot width.

The expansion joints consist of two lengths of Flexcell asphalt-impregnated felt, ¾ inch thick, 8½ inches deep, and 11 feet long. These are supported in Bethlehem Steel joint assemblies known as Type K; they consist of slip dowel bars, 10 inches long, made of thin metal fashioned in the shape of a wedge. The dowels are 3 inches deep; they are 1½ inches wide at the top and ¼ inch at the bottom, which rests on the subgrade.

Dowels are spaced on 12-inch centers beginning 6 inches from the edge of slab. The side towards the paver is the expansion end and is made bondless with a thick coat of asphalt. The fixed end, or that away from the paver, is secured to the ground with pins driven through holes in the metal. When erecting a bulkhead at the end of a day's pour, the fixed and expansion ends were reversed, with the expansion end left out of the concrete until the work was resumed.

A metal cap with 1-inch lips on both sides protected the top of the expansion material until the finishing machinery had passed; then it was removed. The top of the felt was placed so that the joint is ⅜ inch below the surface of the concrete. Between the pavement and divisor strip a ¼-inch thickness of expansion material is installed.

For the contraction joints, Bethlehem assemblies were also used. They are the same type as the K expansion joints except that a thin steel plate was substituted for the felt and the dowels do not slide. The top of the steel plate is ⅜ inch below the concrete.

Batch Plant

A batch plant was set up in Mt. Pocono at the north end of the contract. From a switch in the line of the Delaware, Lackawanna & Western Railroad two tracks, each 400 feet long, were first laid. On the north side of this double track a Blaw-Knox 30-yard 3-compartment aggregate bin and a Butler 300-barrel cement bin were set up. A similar aggregate bin was also erected just south of the siding.

The contractor decided to use two aggregate bins because of the very limited space available for building up storage stockpiles around the batch plant. Aggregate was also very difficult to obtain last year in this region. So in order not to be caught short on needed material, the contractor stockpiled a good supply of aggregate on portions of both the old and new pavement which were not being used by traffic at the time.

Bulk cement, with an air-entraining agent already added at the cement plant, was shipped in hopper-bottom freight cars from the Nazareth Portland Cement Co. at Nazareth, Pa., about 40 miles away. A worm gear and enclosed bucket elevator conveyed the cement from the cars to the storage bin. Sand and gravel, the fine and coarse aggregate, were purchased from the Portland Washed Sand & Gravel Co. at Portland, Pa., 28 miles distant. This material was also shipped by rail and was unloaded by two cranes which built up the stockpiles and kept the bins charged. A Northwest with an 80-foot boom and a Lima with a 72-foot boom served the plant, equipped with 2 and 1½-yard Owen clamshell buckets respectively.

The batches used were based on 8.8 bags of cement and contained 37.4 cubic feet. A typical batch with dry weights of aggregate follows:

Cement	829.70 lbs.
Sand	1,375.52 lbs.
2B gravel, fine	1,562.40 lbs.
3A gravel, coarse	1,560.23 lbs.
Water (39.72 gals.)	226.74 lbs.
Total batch weight	5,554.59 lbs.

The water represents a ratio of a maximum of 4.5 gallons to the bag of cement. In this particular batch the surface moisture in the aggregate

(*Continued on next page*)

AD 184

Everybody has commented on the really beautiful four color illustrations contained in the VICTOR Bulletin Form 20 . . . it covers fine welding and cutting equipment . . . it will be yours, free, for the asking. Write us today for your copy.

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● That's right, dual control—a new, practical TL-20 feature that "lets you have your cake and eat it, too" insofar as mobility is concerned. Here's a two engine unit offering the "get up and go" mobility of the Moto-Crane between jobs and, which on the job, becomes a Self-Propelled unit operated and air steered from the turntable cab and powered for on-the-job mobility by the turntable engine.

Conversion from Moto-Crane to Self-Propelled unit represents a simple 5 minute operation. The TL-20 Moto-Crane, with Dual Control, is available as a 4-wheel unit with front wheel drive or a 6-wheel unit with or without front wheel drive.

TO-THE-JOB MOBILITY The TL-20's rubber-tire Moto-Crane mounting has 8 speeds forward, ranging from 1 to 33 M. P. H., and 2 reverse speeds. There's high speed travel for the highway plus a low speed range and "soft ground flotation" to master rugged off-the-road travel. Neither distance or terrain is a problem to the fast-stepping, sure-footed Moto-Crane.

ON-THE-JOB MOBILITY Conversion to a Self-Propelled unit saves time on the short moves about the job. Once the changeover is completed, the operator merely starts the turntable engine and goes to work. On-the-job travel is powered by the turntable engine at 1 to 8 M. P. H. in either direction. Steering is by air power with all steering and brake controls located conveniently at the operator's position in the turntable cab.

Complete data on the Dual Control TL-20 can be obtained from your local Thew-Lorain distributor.

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amounted to 12.5 gallons, while 27.22 gallons was added at the paver.

The gradation limits of the sand and the two kinds of gravel were as follows:

Sieve Size	Per Cent Passing		
	3A Gravel	2B Gravel	Sand
2½-inch	100	....	....
2-inch	90-100	....	....
1½-inch	35-70	....	....
1¼-inch	....	100	....
1-inch	0-15	90-100	....
¾-inch	....	20-50	....
⅜-inch	....	....	100
No. 4	....	0-10	90-100
No. 20	....	....	35-75
No. 50	....	....	10-30
No. 100	....	....	1-8

An average of 11 trucks, rented and paid for on a batch-haul basis, transported the materials from the plant to the paver. They included a Brockway which carried three batches, while the remaining 10 which hauled two batches each included 4 Internationals, 3 Fords, 2 Chevrolets, and a GMC. The average haul was 3 miles.

Paving Operations

Paving was done by a Rex 34-E dual-drum paver; each batch was mixed a total of 1¼ minutes in both drums. On the first lane the paver worked outside the forms on the subgrade, but on the next lane it worked on top of the new concrete. Composition mats were laid in front of the crawler treads to protect the new surface, and a rubber tire was secured to the bottom of the paving skip to act as a cushion when it rested on the concrete. On the wide 22-foot pavement the batch trucks had ample room to maneuver as they backed up to the paver. Blocks in the skip guided the trucks to the exact point for dumping their loads.

Water for the concrete was obtained from three different creeks crossing the job; this lessened the haul distance. A 6-inch pump at the creek filled a 2,000-gallon tank mounted on a Mack truck which brought the water to the paver. This truck carried a Sterling 3-inch pump which transferred the water to a 1,500-gallon trailer-mounted tank pulled along by the paver. A Rex 3-inch pump on the paver in turn drew water from the supply tank to the tank on the paver.

Batches were run out in the 1½-yard bucket on the paver's 35-foot boom and deposited on the subgrade in front of a Blaw-Knox spreader. A screw at the front of the spreader distributed the concrete evenly between the forms so that only two puddlers were required in the pit. At the rear of the spreader a strike-off blade leveled the concrete to a plane slightly less than 2 inches below the top of the forms. Down the center line of the 22-foot lanes ½-inch round dowels, 4 feet long, are embedded in the concrete just below this strike-off level on 5-foot spacing except near the expansion joints. There two are placed 1 foot on each side of the joint, the next two are 2 feet 1 inch farther along, and the others are set on 5-foot centers.

Wire-mesh reinforcement is also included in the pavement design, and after this was placed more concrete was deposited to fill the forms to the top. The strike-off blade on the spreader was raised to work on top of the forms and this added concrete was then screeded. The weight of the concrete and the screeding resulted in the mesh reaching the required level, or 2 inches below the top of slab. The dowels and reinforcing mats were supplied by the Bethlehem Steel Co. from its Philadelphia plant.

The spreader was followed by a Jaeger-Lakewood double-screed finisher which made two passes over every foot of concrete. The concrete was not vibrated but it was spaded along the forms on each side. Behind this came a Koehring Longitudinal Finisher which had a cutting wheel mounted front and center to start the cut for the longitudinal center-line joint.

Two finishers followed the machines, checking the surface with 10-foot steel straight-edges with 14-foot handles so that the full width could easily be reached from each side. Any adjustment, removing high points or filling in low spots, was done with either the straight-edges or wooden floats. The floats were 4 feet long x 6 inches wide x 2 inches thick and were also at the ends of long handles.

A Flex-Plane machine was next in line. It completed the cutting of the center-line joint and filled the incision with pre-molded bituminous paper, 2¼ inches deep x ¼ inch wide. The joint filler was left just a trifle high so that later when the concrete had hardened it could be readily leveled off with a spade flush with the surface of the concrete. This center-line joint divides

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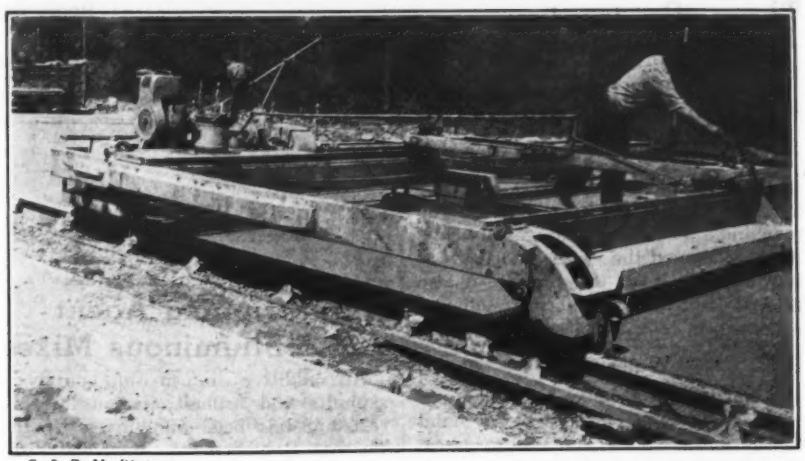
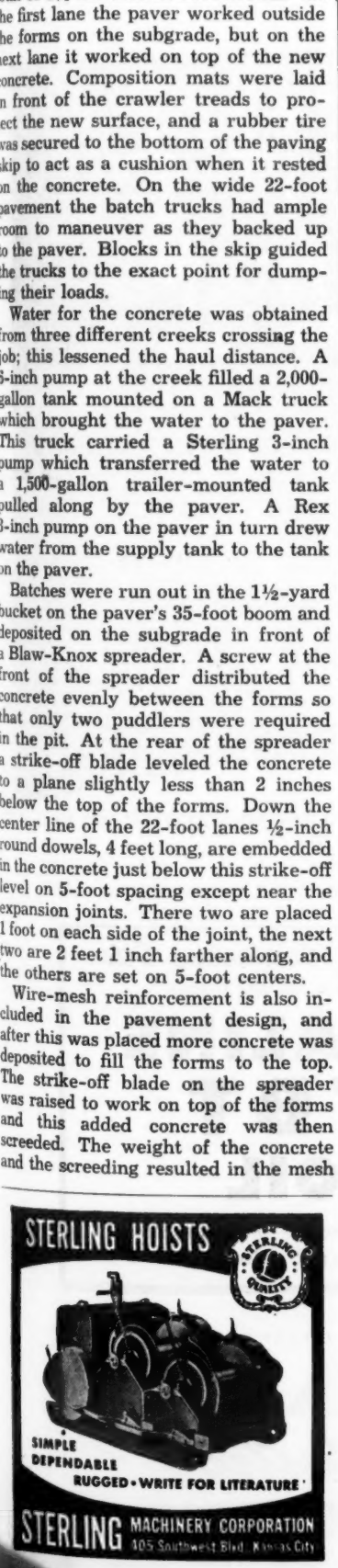


C. & E. M. Photo

A Koehring Longitudinal Finisher moves laterally across a 22-foot slab of concrete on the Lackawanna Trail, behind a Jaeger-Lakewood transverse double-screed finisher.



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If you are buying wire rope for crowd lines or any other job get the help of an experienced American Cable engineer. Every salesman of American Cable wire rope has the exact specification (construction and grade) for every wire rope application. He can save you time and money. Wire for him today.
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Three Contractors Build Concrete Road

(*Continued from preceding page*)

the 22-foot paving into 11-foot traffic lanes. At the back of the joint-cutting machine a piece of burlap was attached which removed the excess moisture as it was pulled over the surface; it also gave the concrete a slightly roughened appearance.

Water Cure

Following the mechanical equipment were two bridges used by the hand finishers to edge the joints and remove the caps from the expansion material, and to spread on the burlap for curing. Along the forms a ¾-inch-radius tool was used for edging, but the longitudinal, expansion, and contraction joints were edged to a ¼-inch radius. The pavement has a center crown of 0.1 inch per foot.

As the concrete acquired a set, a double thickness of burlap was spread over the surface. This covering was kept thoroughly wet for 24 hours. Then it was removed and replaced with a heavier covering of jute mats. These mats were also soaked for an additional 48 hours. The jute coverings were considered too heavy to place on the concrete right after paving had been completed.

Water for the curing was brought in on a 1,500-gallon tank trailer pulled by a rubber-tired Euclid. After the 72-hour curing period, the expansion and contraction joints were poured with asphalt cement and mineral filler. Forms were removed after 24 hours but no traffic was allowed on the new paving until 10 days had elapsed. When the weather permitted normal working conditions, from 900 to 1,000 linear feet of 22-foot pavement was laid in a 10-hour day. An average force of 90 was employed.

Quantities and Personnel

The major items in the three contracts which total $3,614,652 for the 16.8 miles of new highway are listed in the accompanying table at the top of the page.

Contractor personnel included J. M. Long as Superintendent, and R. C. Hertzler, Jr., as Engineer for C. W. Good, Inc.; G. J. Pacchiana, Superintendent for G. J. Packey Co.; and Glenn Walker, Superintendent for Geo. M. Brewster & Son, Inc. For the Pennsylvania Department of Highways, E. J. May was Inspector on the C. W. Good, Inc., contract, while H. R. Saltern was Inspector on the other two jobs.

The project is located in District 5-0 of which G. E. Handwerk is District Engineer with headquarters at Allentown. The Department of Highways is headed by Ray F. Smock, Secretary of Highways, and E. L. Schmidt, Chief Engineer.

Items and Quantities

	C. W. Good, Inc. $1,545,096 5.8-miles	G. J. Packey Co. $606,000 3.9-miles	Geo. M. Brewster & Son, Inc. $1,463,556 7.1-miles
Excavation	436,376 cu. yds.	128,000 cu. yds.	407,000 cu. yds.
Reinforced-concrete pavement			
9-inch uniform	139,324 sq. yds.	84,000 sq. yds.	.....
10-inch uniform	.....	.....	144,857 sq. yds.
Concrete for bridges	3,301 cu. yds.	392 cu. yds.	1,113 cu. yds.
Bridge reinforcement	335,515 lbs.	35,655 lbs.	115,731 lbs.
Special subgrade, 8-inch	.....	.....	159,298 sq. yds.
Corrugated-metal pipe			
15 to 54-inch	1,034 lin. ft.	496 lin ft.	2,376 lin. ft.
Reinforced-concrete pipe			
12 to 30-inch	7,866 lin. ft.	5,250 lin. ft.	4,721 lin. ft.
Tile underdrain			
4 and 6-inch	15,000 lin. ft.	3,095 lin. ft.	12,893 lin. ft.

Anti-Stripping Agent For Bituminous Mixes

An additive for making cut-back asphalts and asphalt cements water-resistant has been announced by the Thomas Robinson Co., Inc., 620 Fifth Ave., New York 20, N. Y. Kling is said to have a high resistance to stripping immediately after mixing and without cure.

Advantages claimed for Kling include these: it facilitates the coating of wet aggregate with liquid bituminous materials, increases the resistance of bituminous films to stripping in the presence of moisture, improves the desirable characteristics of the bituminous material, maintains the compressive strength of bituminous mixtures, and reduces their loss of stability due to the detrimental action of water.

Kling is warmed and added to the heated bitumen. Thorough mixing is essential and, according to the manufacturer, is usually accomplished by circulating in the distributor with a pump or by air agitation for about 30 minutes. At the refinery, Kling can be added to the solvent used to cut back the asphalt.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 5.

Bucket and Grapple Data

A 24-page catalog covering its complete line of buckets and grapples has been issued by The Owen Bucket Co., 6030 Breakwater Ave., Cleveland 2, Ohio. This catalog describes and illustrates the features of Owen buckets and grapples, and makes recommendations to aid in selecting the proper bucket for any kind of service.

The catalog lists eight performance features of the buckets, details of construction, and sizes and specifications for each type in the line. It also describes the counterweight jackets, teeth, and attachments.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 53.

National Carbide Are

Simple in construction

Economical in cost

Dependable in operation

Available in 1,500, 8,000 and 16,000 candlepower units

Write for literature showing complete line of Floodlights and Lanterns

FLOOD LIGHTS

NC 200 6

NATIONAL CARBIDE CORPORATION

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This special refrigerating apparatus at Sinclair Laboratories tells an important story every day to research experts and refinery control technicians.

The thermometers, shown above inserted in lubricating oil samples, record temperature as cold is increased in the special refrigerating apparatus. Trained observers check the samples frequently, test for pour point. Sinclair, thus, makes sure that its lubricants retain full protective qualities even at sub-zero temperatures . . . when your specific application demands.

Such constant manufacturing control and research assures you that famous Sinclair lubricants . . . and all new Sinclair products . . . will give outstanding performance to meet your most exacting requirements.

Sinclair Automotive Oils
For Truck, Bus, and Tractor

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Positive lubrication — Maximum power
For the long pull, under heavy loads

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SINCLAIR

Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

The Laughlin replacement swivel-hook assembly incorporates the Laughlin safety latch. It comes in ½ and 1-ton sizes, and is said to require no machining for installation.

Swivel-Hook Assembly

A replacement swivel-hook assembly has been made available to the public by The Thomas Laughlin Co., 133 Fore St., Portland, Maine. It incorporates Laughlin's recently improved safety latch. The new hook comes in ½ and 1-ton sizes. It is recommended by the manufacturer for cranes, hoists, and lashing applications.

According to the company, no machining is required to install this hook. The old assembly is unbolted, and the new one bolted on in its place. A graphite-impregnated bronze washer is under the nut to provide the swivel action. The swivel bolt is made of a heat-treated alloy.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 45.

Valve-Spring Depressor

A valve-spring depressor for use in diesel-engine maintenance is described in literature from the Paxton-Diesel Engineering Co., a subsidiary of the Paxton-Mitchell Co., Omaha 5, Nebr. The folders show how the Safe-N-Ezy depressors work and list six features which make them useful around diesel-repair shops. They also contain a list of the models in which the depressors are made and the engines which they will fit.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 57.

OILED AIR* FOR PNEUMATIC TOOLS

New ARNOLD LUBRICATOR

Light Weight
Easily Portable

The new Arnold Lubricator supplies oiled air* for all pneumatic tools. Arnold gives you all of these features:

VISIBLE OIL SUPPLY—The pressure-proof window eliminates guess work. If oil is there, you see it.

POSITIVE LUBRICATION — good to the last drop. Patented feeder insures automatic lubrication.

LIGHT WEIGHT — made from new aluminum alloy, most popular size weighs only 14 ounces.

STRONG—this rugged lubricator can take it, actually stronger than cast iron.

FOUR MODELS—Sizes from 1/6 pt. to 1 pt. capacity. Pipe size to one inch.

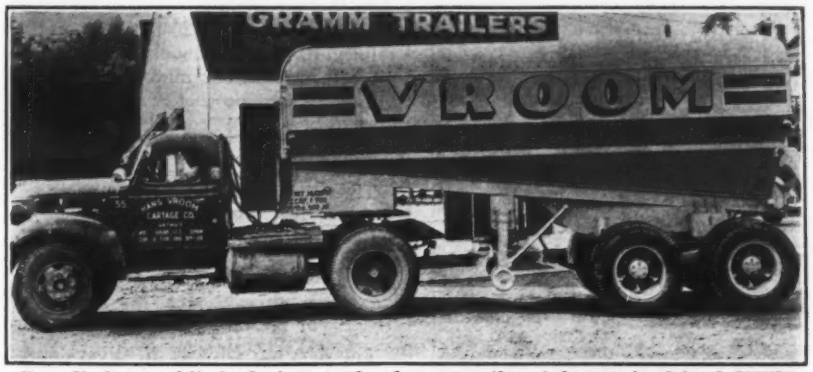
FREE—CATALOGUE SHEET
Order from your dealer
If he cannot supply you, write direct, sending us your dealer's name.

The RUCKER Company
4228 Hollis Street Oakland 8, Calif.
*Copyright 1945

Bulk-Cement Trailer Suspends Load on Air

A trailer specially designed for hauling bulk cement or other light granular materials has been announced by the Gramm Trailer Corp., Delphos, Ohio. Feature of the trailer is aeration of the load during unloading operations, to permit the cement particles to flow easily on an incline of only 4 degrees. This aeration is accomplished by running air, under pressure, through a taut piece of canvas belting on which the load is carried. At present, the trailers are made in two sizes: one for 100-barrel, the other for 125-barrel loads.

The trailer body consists of the main hopper, the load being then distributed into two hoppers with inclined walls. These are widely separated at the front, but taper to a common discharge gate at the rear. At the bottom of each hopper is a steel box-section member with a 10-inch-wide canvas belt. This belt provides the surface on which the load rests and from which it is discharged.

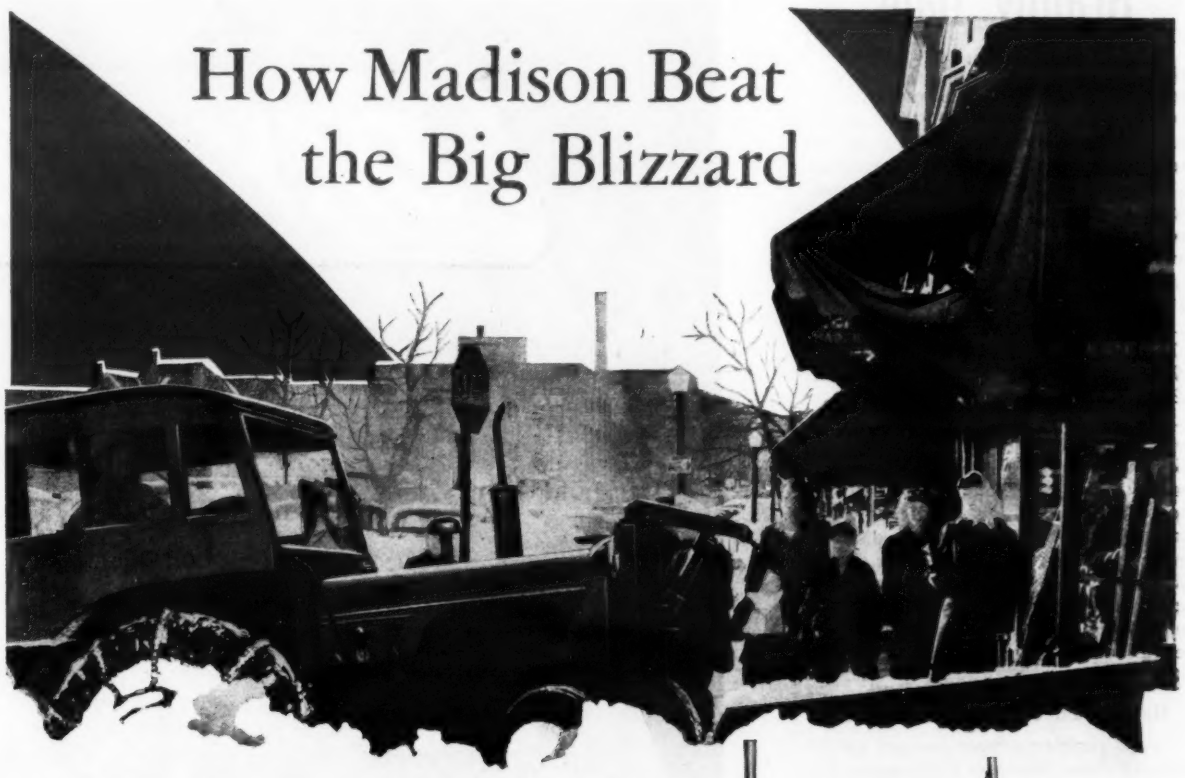


Free discharge of its load at an angle of no more than 4 degrees is claimed for the Gramm bulk-cement trailer. This is accomplished by aeration of the load: air under pressure is run through a taut piece of canvas belting on which the load rests.

During unloading operations, air under 2-pound gage pressure is forced through the canvas. A single-cylinder 4-hp air-cooled gasoline engine, direct-connected to a Roots blower, provides this air. The system is said to permit free discharge of the load in a few minutes, at an angle of no more than 4 degrees. Provision is made in the top of the trailer to remove dust through another opening while loading, so as to assure dust-free unloading at the other end.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 36.

How Madison Beat the Big Blizzard



● When the big blizzard of January, 1947, blanketed the Midwest and some cities were snow-bound for weeks, there was no such paralysis at Madison, Wis. Madison had the snow—but also had equipment to conquer it in a matter of days. One of its Case-powered reversible-blade plows is shown above.

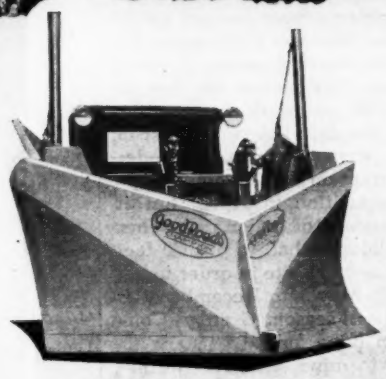
With Case tractor-mounted plows you have two chances. Normally you work swiftly, keep ahead of the snow. But if an unusually bad storm blocks your roads and streets, you are ready to open them. These compact, close-coupled units have amazing ability to break their own trail, maneuver in close quarters, get through tough spots.

Case tractors are well fitted for snow removal work because they have extra strength to stand shocks and strains in sub-zero cold. Case engines have "lugging" ability that pulls all the stronger as they slow down. Case gears have extra size and strength to stand up under galling loads. It all adds up to the ENDURANCE for which Case tractors are famous.

CASE

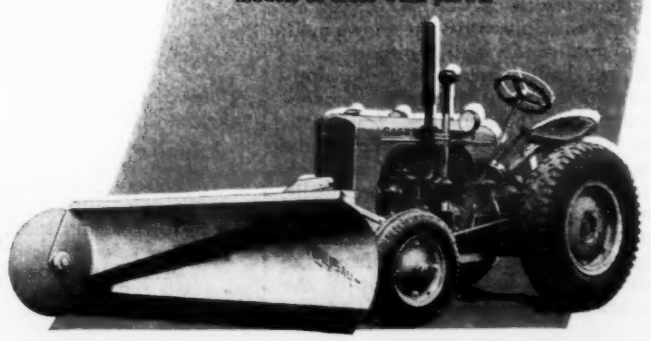
COMPLETE, COMPETENT SERVICE

Your Case industrial dealer is strategically located to serve you conveniently, staffed and stocked to serve you well. Besides Case tractors and engine units he offers related equipment such as tractor-mounted cranes, loaders, winches, snowplows, and rotary brushes. Specializing in the power and equipment problems that prevail in your area, he has the broad experience that can be helpful to you in the choice, use and care of equipment. J. I. Case Co., Racine, Wis.



Especially engineered for Case tractors are both reversible-blade plows and V-type plows, as shown here in a large size with wide wings on the mighty Model "LAL"

Sidewalk plows are built for use with Model "SI," as shown here, and for the "DI" and "VAL" There are also several models of cross-walk plows.



Granby Constructors Photo

Bulldozers inched down those abutments, sometimes almost on their noses, to strip away the overburden and roll it down to waiting shovels and draglines.

Granby Dam

(*Continued from page 2*)

ing as they go up the abutments.

Containing about 3,500,000 cubic yards of material, the dam is to be built largely of 3-inch-minus material in a big central impervious zone, flanked upstream by a pervious zone of rocky fill with riprap protection. The same pervious fill will flank the downstream slope, augmented by the weight of a rock fill.

According to preliminary borings, solid rock was expected at elevation 7,990, with the top of the dam to be 8,290.

Another part of the Granby contract is the construction of Dike No. 3, containing about 750,000 cubic yards of material. Dikes 1, 2, and 4, all a part of the Granby storage system, were started before the war but were discontinued in October, 1942, by order of the War Production Board. A permanent outlet tunnel was also built at that time and finished, with the exception of needle valves which are to be installed later.

Honnen Faces Tough Problems

Tough problems have teamed up to plague Project Manager Ed Honnen. To start with, the working season is short. Frost stopped construction the first of December, 1946, and work could not be resumed on the dam before the first of May. Some work was started under another contract on the Granby pumping-plant excavation in April, but it was not composed of major pay items. Even so, bulldozers had to push 2 feet of snow off the work site in order to get started at all. May 1 to December 1 is about the best season Granby Constructors can hope for.

With that in mind, consider the organization of this big job. Some of the key men can, of course, be absorbed in the winter repair programs of the various Granby contractors, but many of the equipment operators, laborers, and others have to be laid off, to drift away and never return. That means a nearly complete reorganization of the job each year before it can be picked up again.

The diversion of the Colorado River, a stream which carries up to 3,000 cfs in June and July when the snows melt, is no small undertaking, either.

Steep, badly fractured rock abutments have had to be cleared of overburden and broken-rock fragments. One of the most spectacular parts of the job, its details will be described later. Confined within narrow gorge walls, the job has scarcely any room for equipment to work. There is an elevation differential of 135 feet from the bottom of the hole to the top of the protective cofferdam.

In the borrow pits, oversize rocks are running from 18 to 20 per cent of the total yardage and shovels are forced to pit-select the finer material until the big rocks can be shot. The material is also so heavy that considerable trouble has cropped up at the classification or screening plant.

These are a few of the problems which have harassed Honnen on the way to bedrock. They are being solved in the best tradition of the construction profession, as we shall see.

River Diversion Comes First

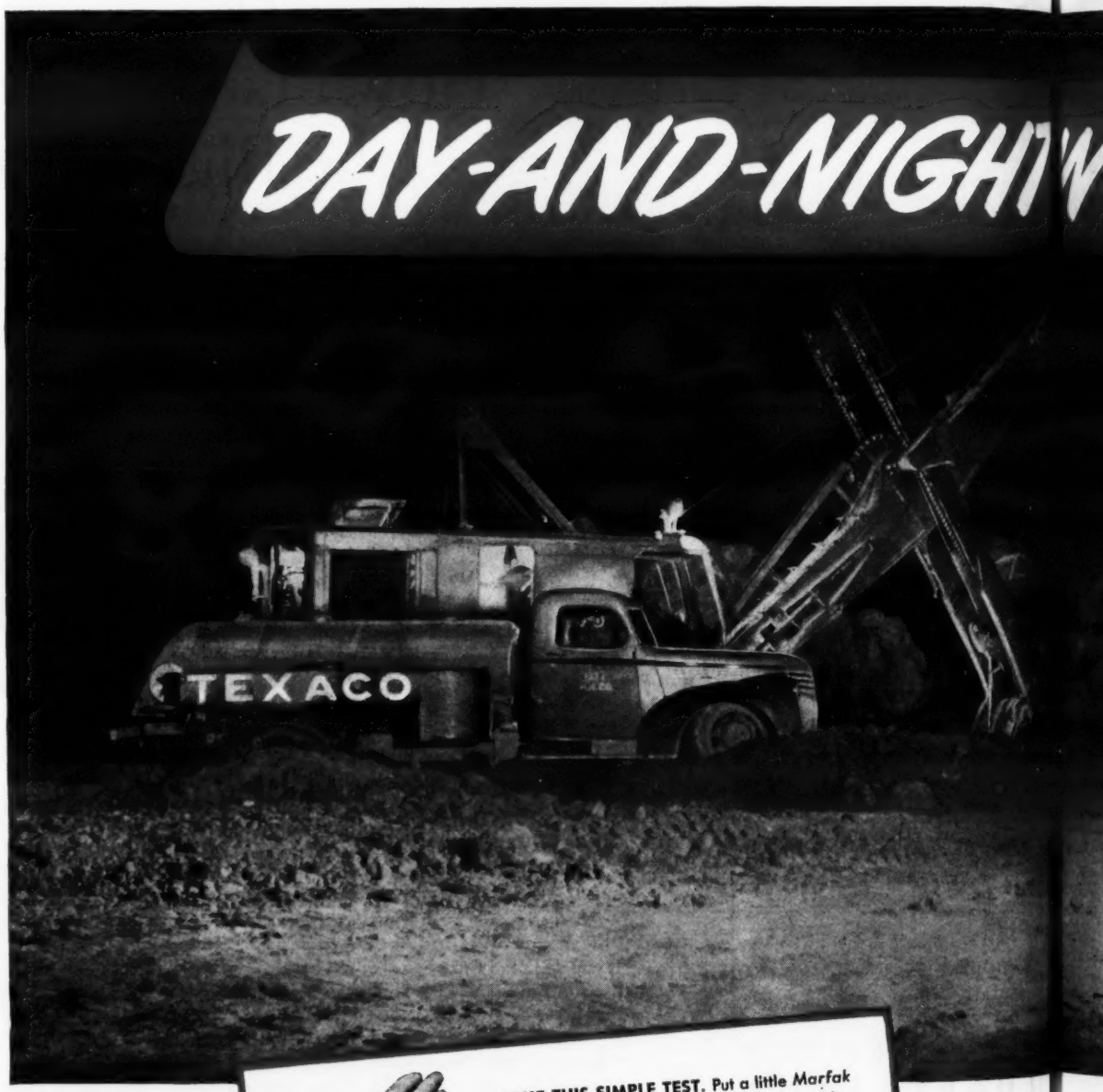
The first big job was the diversion of the Colorado River through the previously constructed outlet works. Granby Constructors decided to divert the river by crowding an earth-fill cofferdam from both sides, closing the gap suddenly to build a pool. When this pool filled a few feet the river would flow through the outlet works.

Thousands of cubic yards of earth and rock were built out from both sides

(*Continued on next page*)

R. G. Zellers Photo

It was tricky business for bulldozers to work overburden down this left abutment, which looms here behind a Lima dragline and an end-dump Euclid. At the left in this photo is part of the protective earth cofferdam Granby Constructors erected.



MAKE THIS SIMPLE TEST. Put a little Marfak in the palm of your hand. Rub it with a circular motion and notice how it liquefies to a fine oiliness under friction while retaining its original tough consistency in the surrounding "collar." Just so, in a bearing, Marfak lubricates wearing surfaces, while its "collar" seals out destructive dirt and moisture, assuring longer bearing life.

Tune in . . .
TEXACO STAR THEATRE
presents the
TONY MARTIN SHOW
every Sunday night.
METROPOLITAN OPERA
broadcasts
every Saturday afternoon.

TEXACO

TEXACO

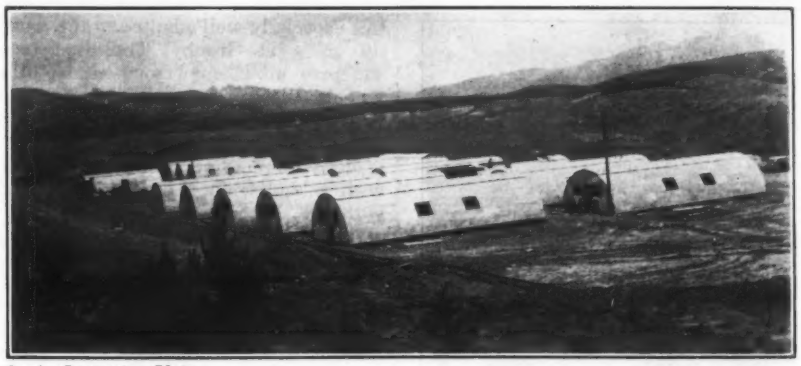
C. & E. M. Photo
Project Manager Ed Honnen catches up with desk work in his Granby Dam office.

of the stream. Then, with a spectacular show of speed, two Caterpillar bulldozers mounted on Caterpillar D8's filled the plug. Angrily the river ate around the edges, and sullenly came to rest as the plug was laid across the stream.

Working desperately, then, to build the plug higher before the pool could catch up, men and equipment literally poured the dirt to this cofferdam. It rose higher. The water built up to the level of the outlet tunnel, and the first few gallons of the billions that will follow in years to come poured down the circular concrete-lined bore to surge in sudden fury with a hydraulic "jump" below the dam.

Behind this initial barrier, construction proceeded with the permanent cofferdam. Actually the cofferdam in itself is temporarily taking the place of Granby Dam. It is successfully holding the full river flow all the way across the canyon floor. As a part of the finished dam it will be built up to elevation 8,122, 132 feet above the theoretical bedrock line, and left in place at the upstream toe of the big barrier.

Despite bad weather, this cofferdam is being crowded up to its finished elevation to protect the men working 60 feet below the river floor in their search for solid bedrock all the way across the gorge floor.



Granby Constructors Photo
This view shows the camp site maintained for employees of Granby Constructors.

Abutments Stripped With Care

Both the right and left abutments were far from clean. Great deposits of earth, broken stone, decomposed granite, and fractured mica schist covered the jagged edges of solid rock. The management decided this overburden could be moved mechanically if the equipment operators were skillful, careful, and lucky.

Four new Caterpillar D8 diesel tractors with Caterpillar cable-controlled angling dozers and power-control units were brought in. Each machine picked a saddle on top of an abutment where the overburden looked thick enough to start working it down. Honnen's idea was to keep dropping the machines down gradually, as their blades rolled this material over the edge to where shovels and draglines could pick it up.

Working carefully, but sometimes almost standing on their noses, the machines benched the overburden successfully. But it was slow business. Some of the dirt was probably handled many times over as the D8's worked it down the steep mountainsides. In a place or two the big tractors actually dug themselves into a trap, and then had to continue farther down to make themselves accessible for fuel and lubrication service.

One of the key men, who has seen bulldozers in tight places many a time, remarked later, "It was hard for me even to *watch* the rigs up there!"

With jagged outcrops of solid rock in the way of steady benching, quite a few yards of loose material had to be left up on the sides by the bulldozers. Drillers worked on each abutment and shot some of this material. A 45-foot telephone pole was lashed onto a 60-foot Bay City crane boom, fitted with a 4-inch water jet pipe and flexible hose, and the abutments were washed clean after the bulldozers and powdermen finished.

Hydraulic sluicing was done both from the top of the abutments, and from the working bench farther down. The result was a pair of clean abutments, which the Bureau of Reclamation officials could inspect carefully prior to the high-pressure grouting done later this season. The shiny-clean stone will also allow the impervious earth to be tamped close in, forming a watertight seal forever against the push of Granby Reservoir.

It was a masterful display of efficient mechanical force against natural odds. Men breathed a sigh of relief when it was finished. One of the bulldozer operators who rode a D8 down the right abutment said, "I wouldn't want to do it again for a long time".

As the overburden rolled down to form a toe on the old river floor, it was scooped up by a new Bucyrus-Erie 54-B shovel and loaded to a fleet of four end-dump Euclids, which carried the material on over to raise the cofferdam. A Lima 802 dragline was also brought in to start the bottom excavation, and a Lima 1201 shovel saw some service.

Getting Down to Bedrock

As tough as the abutment stripping had been, the battle to get down to bedrock across the canyon floor was even worse. Where the abutments had been covered with generally loose material, great pockets of loose rock

(Continued on next page)

IT WORK PROVES...

"EFFECTIVE LUBRICATION"

Reduces Maintenance Costs

WHEN machines must run on round-the-clock schedules, that's when you need "effective lubrication" — the ability of your lubricant to *stay in the bearings* despite heavy loads and rough service . . . to give extra long hours of protection. And for that, nothing beats *Texaco Marfak!*

Marfak is tops for bearings in truck chassis, tractors, bulldozers, shovels and other equipment — a tough, tireless lubricant that gives *longer lasting* protection because it prevents rust and seals out dirt and moisture. Saves you money on maintenance costs.

In wheel bearings, *Marfak Heavy Duty* forms a fluid lubricating film inside, retains its original consistency at the outer edges . . . thus sealing itself in, sealing out contaminants . . . assuring longer lasting protection with no need for seasonal change.

For engines — heavy-duty gasoline and Diesel — *Texaco Ursa Oil X*** assures top efficiency and economy. *Ursa Oil X*** is fully detergent . . . dispersive . . . highly resistant to oxidation. It keeps engines clean.

Save time and money by using Texaco Simplified Lubrication Plan. For full details, call the nearest of the more than 2500 Texaco distributing plants in the 48 States, or write The Texas Company, 135 E. 42nd St., N. Y. 17, N. Y.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

Granby Constructors Photo
High up on an abutment at the Granby Dam site, a driller sinks a hole to shoot a jagged outcrop of solid rock. A safety rope lies at his feet.

Granby Dam

(Continued from preceding page)

blocked the way to solid material at least 60 feet under the river. While these pockets were too hard to be dug by the heavy-duty excavating machinery without blasting, they were unacceptable to the Bureau of Reclamation as foundation material because of the nature of their disintegration.

Therefore there was only one thing to do . . . take all this material out.

That is considerably easier to write about than to do. For one thing, the elevation differential between the digging site and the disposal site soon proved a disadvantage. Too, the material was hard, and working room was limited. Rain and sleet and snow fell almost continuously on the steep haul road.

The Euclids were equipped with a new type of pneumatic tire, with crosswise cleats at an angle of about 70 degrees to the tire body. Developed by Goodyear, these tires are somewhat larger across the tread than they are across the sidewall section; the theory is, of course, to reduce tire penetration in the ground and so increase the driving-gear efficiency range of the hauling unit.

These tires have shown characteristics especially well adapted to the muddy going at Granby. The dual tires squeeze mud out from under the wheels, they resist rocks wedging between them, and what is probably most important, they make it possible for wagons to come on up out of the hole with a load while those still equipped with conventional tires stick and spin.

According to Ed Honnen, installing these tires as rapidly as possible on their rubber-mounted hauling equipment made it good for severe wet-weather hauling, and is one of the big reasons why this tough excavation has been possible.

As the river-floor excavation went down farther and farther, more and more drilling had to be done. Three air compressors—a 250-cfm Chicago Pneumatic, a 550-cfm Sullivan, and a 500-cfm Ingersoll-Rand—were moved in as close as possible and a steel 4-inch air header laid to run the Gardner-Denver drills which were used. With Timken steel and detachable rock bits, the large rock and the rejectable pockets were drilled and loaded with 40 per cent gelatin stick powder, about ¾ pound per cubic yard, and shot. Drill

(Concluded on next page)

Granby Constructors Photo
This Bucyrus-Erie 54-B shovel works far into the night to load out cofferdam material to be used at Granby Dam, new key link in the Colorado-Big Thompson project.

DURBIN-DURCO, Inc.
Manufacturers Certified Specialty Products
Malleable Iron • Drop-Forged • Steel
LOAD BINDER — MALLEABLE IRON
Heat Treated • 5 Sizes
With New, Improved, Reinforced Non-Spreading Mouth

Pat. Pending

		1 Swivel	Wt. Each
MIDGET	No. 1	¼" chain	2¼ lbs.
DELTA	No. 1	⅜ or ½" chain	6½ lbs.
		Two Swivels	Wt. Each
DIXIE	No. 1	⅜ or ½" chain	10 lbs.
LONE STAR	1	⅜, ½ or ⅝" chain	14 lbs.
LONE STAR	2	⅜, ½ or ⅝" chain	17 lbs.

LOAD BINDER — DROP-FORGED
Heat Treated • 2 Sizes

Two Swivels
Durbin-Boomer F-1—for ⅜", chain . . . . 10 lbs.
Durbin-Boomer F-2—⅜, ½ or ⅝" chain . 12 lbs.

Other Durbin-Durco Products
COMBINATION ROPE HOIST AND WIRE STRETCHER • Extra Heavy Duty
ALL-STEEL ROLLER BEARING, ROPE HOIST
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Lever Action, Double Ratchet, Also Worm Gear Type
WRITE FOR CATALOG • Dept. CEM
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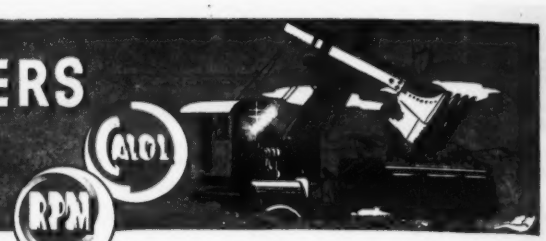
STANDARD ENGINEERS NOTEBOOK



Shock-resisting grease lengthens bearing life

To prevent extra wear and the necessity for replacing wheel bearings during the life of a vehicle, service them regularly with RPM Wheel Bearing Grease.

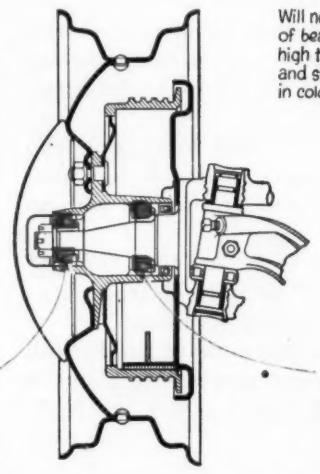
A short fibre lubricant, specially made for both ball, and roller wheel bearings, RPM Wheel Bearing Grease does not melt and throw out of bearings during hot operating conditions. It feeds slowly from bearing reservoirs and provides thorough lubrication for prolonged periods.

RPM Wheel Bearing Grease has the unusual ability of reducing the pounding of road shocks imposed on wheel bearings. It cushions the force of these shocks, minimizes metal fatigue and overheating and reduces vibration.

Extremely adhesive, RPM Wheel Bearing Grease helps maintain a seal around bearings against corrosive moisture. This seal also aids in keeping dust and grit out of bearings.

RPM Wheel Bearing Grease is specially made for all types of ball- and roller-wheel bearings.

Will not run out of bearings in high temperatures and stays soft in cold weather.



Resists road shocks and stays put under overloads.

Resists rust formation and aids in sealing out grit.

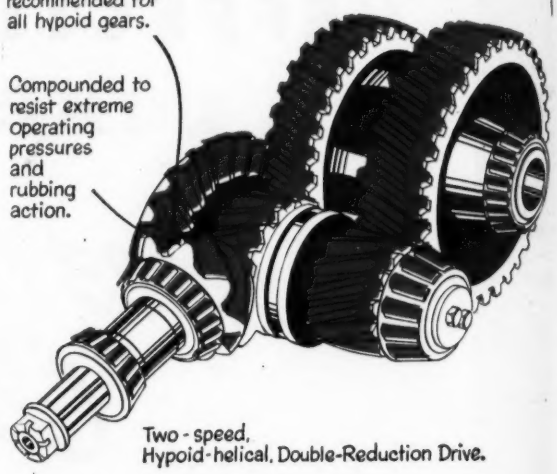
This drawing prepared with cooperation of Timken Roller Bearing Co.

Trademarks, "Calol," "RPM," Reg. U. S. Pat. Off.

RPM Multi-Service Gear Lubricant is recommended for all hypoid gears.

Compounded to resist extreme operating pressures and rubbing action.

Highly oxidation-resistant.



Two-speed, Hypoid-helical, Double-Reduction Drive.

New lubricant can be used in all type gears

The drive gears in automotive equipment operating under the most severe conditions are fully protected by newly-developed RPM Multi-Service Gear Lubricant. It resists the tremendous pressures and extreme temperatures encountered in hypoids as well as in heavily loaded conventional gears.

Special compounds in RPM Multi-Service Gear Lubricant react on tooth bearing surfaces and provide a safety coating. They also give the lubricant maximum resistance to foaming, better resistance to oxidation, and provide better protection from corrosion. The compounds are very stable in the blend and will not drop out of solution.

RPM Multi-Service Gear Lubricant is approved by the Timken Detroit Axle Co. and Buick Motor Division, General Motors Corp. for service use in hypoids, and the Army Ordnance Dept. as conforming to U. S. A. Specification 2-105-B. It is made in four grades: SAE 75 (for Alaska only), 80, 90 and 140.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Colo.; Standard Oil Company of Texas, El Paso, Texas.

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

Granby Constructors Photo
An oversize granite rock is drilled to shoot it down to shovel size. Heavy rock has been just one of the problems to plague Ed Honnen, Project Manager.

bits were resharpened on the job by a bit grinder.

Close behind this operation, sometimes almost with it, a Lima 802 dragline with a 2½-cubic-yard bucket loaded out the broken material. The going got so rough that the Bucyrus-Erie 54-B shovel had to dig itself down and feed the Lima. Then a Model 55 Bay City dragline started doing the same thing. Wherever possible a D8-mounted bulldozer helped out; other times it kept the haul road smooth. It was slow. It was discouraging to see fine new equipment worry around with so little working room that booms almost interlocked.

Excavated material from the cut-off trench was hauled below the center line of the dam and spoiled just above the old ground line within the dam limits. As the big Euclids roared out across this fill and dumped their loads, a D8 Caterpillar and bulldozer was busy keeping the fill smoothed up. Operations on stripping and cut-off-trench excavation proceeded as fast as possible on the basis of a double 8-hour shift.

Through it all was the "summer weather", a chill, dull misery of dampness and cold induced by snow and cold rain. On June 11 in Denver, only 100 miles away, people refused to believe the Granby telephone when it said, "It's snowing up here". But the misery and toil at Granby are part of the price paid by men to make thirsty acres bloom on the other side of the Divide; to generate much-needed power to turn the wheels of industry.

Future Schedule Well Planned

Ed Honnen and the Granby Constructors management know, of course, that while the cut-off walls are being poured and high-pressure grouting is being done, there will be a slow period for earth-moving equipment. So their schedule was planned to move on up ahead to Dike No. 3 and push it as much as possible while this tedious business down in the bottom of the hole was done.

But just as soon as possible, the equipment moved back in to pour the earth fill into the hole so laboriously dug. By the end of this 1947 construction season Honnen hopes to have the foundation of the dam in and finished up to the normal elevation of the Colorado River.

That done, he can breathe easier.

Personnel

Assisting Honnen is Clayton Hoon, Project Superintendent; F. L. Oliver, Engineer; and Bob Pruyne, Office Manager. The U. S. Bureau of Reclamation is represented on the job by Rex Blackwell, Chief Inspector, with Dick Willson as Field Engineer and George Highley in charge of the project as Construction Engineer.

The Colorado-Big Thompson Project is under the supervision of the Bureau of Reclamation, Region VII, at Denver, with C. H. Howell at Estes Park, Colo., as Project Engineer. Plans and specifications for the project were prepared in the office of Walker R. Young, Chief Engineer.

Rail for Highway Safety

Guard rail for safety on the highway is the subject of an 8-page catalog issued by the Tuthill Spring Co., 760 Polk St., Chicago 7, Ill. This catalog features a discussion of six reasons why Tuthill Hyway guards should be included as standard equipment for highway construction.

It contains complete specifications for the rail, spring brackets, support bolts, rail bolts, posts, etc. Instructions tell how to install the guards properly, and diagrams and text show how they absorb impact. This bulletin also covers the Hyway divider and guard rail for bridges.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 76.

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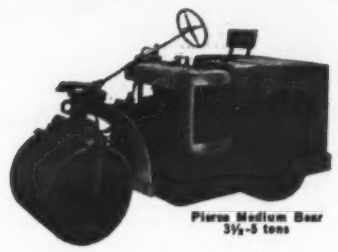

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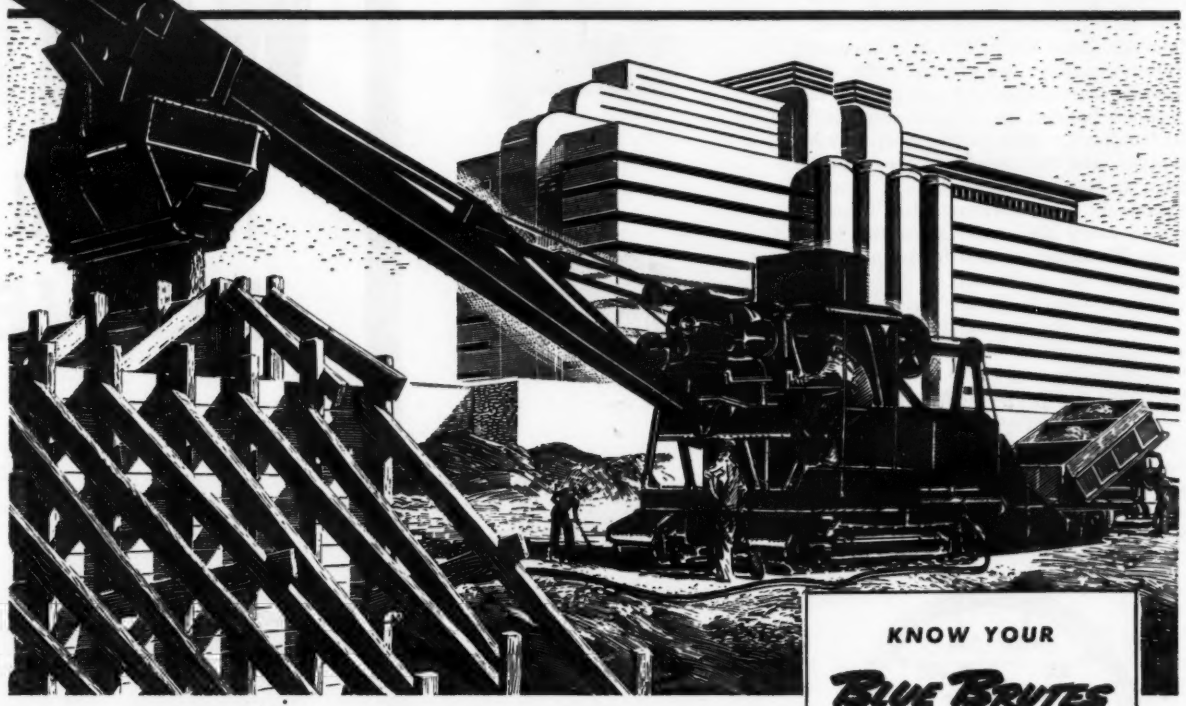

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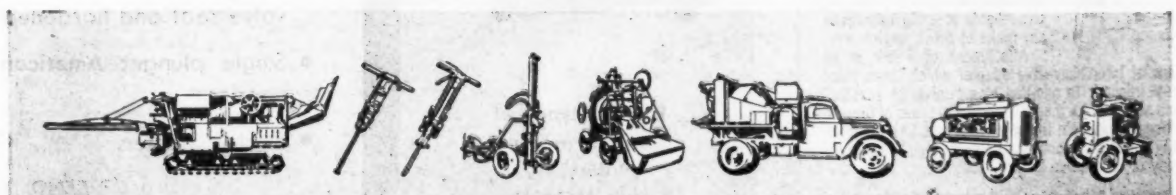

IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

A Bell 47-B helicopter, with a load hooked to a 10-foot cable, delivers the load on top of a sheer-sided hill 150 feet high, on a platform only 22 x 4 feet. Rocky Mountain Steel Corp. used this modern method of delivering equipment to an inaccessible spot.

Air Delivery Speeds Equipment, Supplies

One way of bringing supplies and equipment to isolated and inaccessible projects, where speed is essential or where access roads haven't been built, is to drop them from the air. The working possibilities of this method have been demonstrated by the Rocky Mountain Steel Corp. of Los Angeles.

The company was faced with the problem of transporting equipment to a project located on a sheer-sided hill 150 feet high. Due to the steep climb involved and the weight of the equipment, it was estimated that it would require six men working a full 8-hour day to carry the material to the top. Rocky Mountain turned to the modern helicopter for assistance.

Using a Bell 47-B, the company delivered the equipment in a series of nine flights in an elapsed time of 22 minutes. The cargo was divided into nine loads, each load being hooked to a 10-foot cable suspended from the aircraft. This allowed the helicopter to rise a free 10 feet before being forced to lift the load, and to stay high enough above the job location to prevent the blades from hitting treetops or other dangerous obstructions.

The unloading platform was a leveled area 22 x 4 feet, resting on a narrow ledge just short of the summit. The loading space was in a box canyon just wide enough for an automobile to make a tight turn. The pilot was aided in his maneuvering by hand signals from assistants stationed at strategic points.

A company official, in commenting on the operation, indicated that it was so successful that Rocky Mountain plans to make helicopter deliveries a part of its regular installation service.

Columbus Dealer Opens New Sales, Service HQ

The opening of a new equipment showroom and service plant in Columbus, Ohio, has been announced by the Gibson-Stewart Co. of Cleveland. The address of the new showroom is 721 Oakland Park Ave. G-S is distributor of approximately 25 lines of construction equipment including R. G. LeTourneau, Buffalo-Springfield, J. D. Adams, Pioneer Engineering Works, T. L. Smith, Marmon-Herrington, Foote Co., Osgood and General, Minneapolis-Moline, and Worthington.

Data Cover Clutch Line

A line of friction clutches is described in Catalog No. K-8 issued by the Kinney Mfg. Co., 3529 Washington St., Boston 30, Mass. These clutches are designed for driving machines from a line-shaft and can be arranged for high and low speed, forward and reverse, or can be used as a brake. By proper use of the clutches in a group drive, it is possible, the manufacturer says, to shut down one machine without interfering with the operation of any others in the group.

The catalog describes the Kinney interchange-type clutch, pulley or cut-off styles; the dry-plate disk clutch; the oil-type clutch; and the Worrall-type clutch. Operational features are described and sizes and models are listed. The catalog also lists other products made by Kinney: bituminous distributors, pumps, etc.

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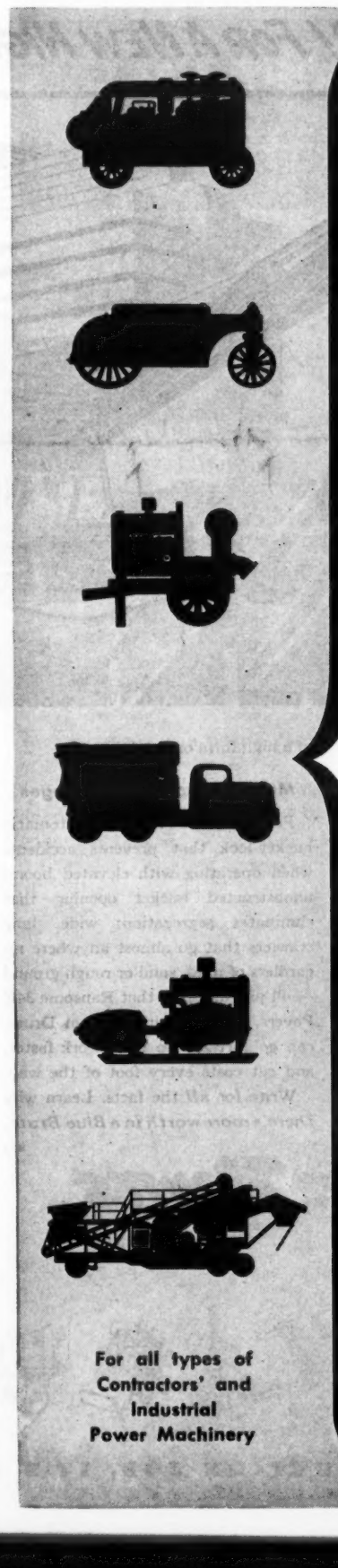

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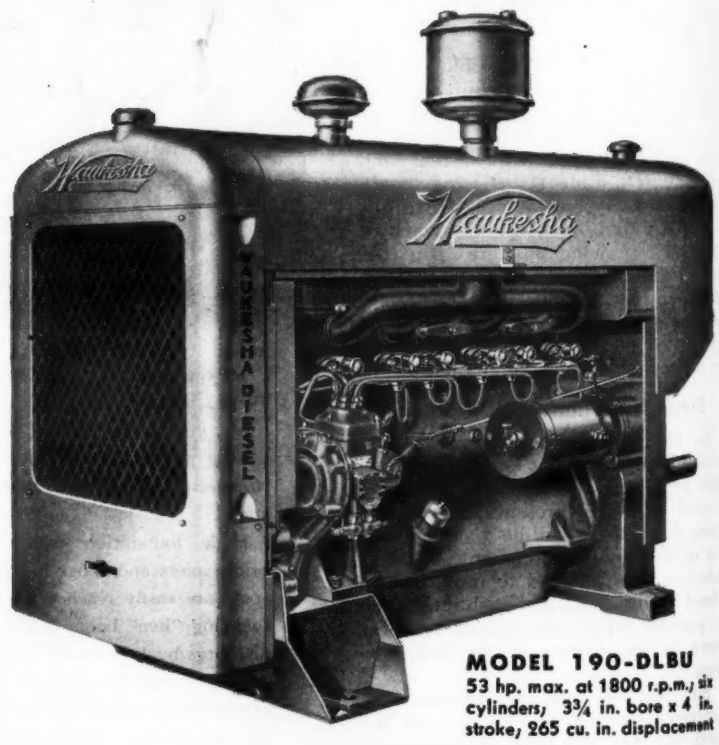

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Highway Chiefs Hold 33rd Annual Meeting

AASHO Petitions Congress For Funds To Continue Present Road-Construction Program Through 1951

+ MEETING in New York City for its 33rd annual convention, the American Association of State Highway Officials in one of its formal resolutions petitioned Congress to authorize not less than $500,000,000 for highway construction for each of the fiscal years 1949, 1950, and 1951. This fund would continue the present road-building program which was authorized under the Federal Highway Act of 1944. The Act granted to the states $500,000,000 in Federal Aid for each of the three successive post-war fiscal years of 1946, 1947, and 1948. State highway officials stressed the fact that such aid requires advance surveys and planning so that the funds may be employed effectively and efficiently.

Dewey Greets Convention

Over 960 delegates from all the states except Idaho registered for the meeting, which was held in the Waldorf-Astoria Hotel, September 22-26. Nearly 235 guests and visitors having interests allied to highway construction and maintenance were also in attendance.

At the first general session, Governor Thomas E. Dewey of New York welcomed the highway group and stressed the importance of highways both to the small community and to the great metropolis. He reminded the delegates that 43 per cent of the communities in this country are dependent solely on highways for land transportation. As examples of the reliance of large cities on highways, the Governor mentioned that 70 per cent of the milk supply of New York City comes in by truck; that in Chicago 85 per cent of the eggs, and 91 per cent of the poultry consumed is hauled to the city over the highway system.

Governor Dewey spoke of the part the State of New York has taken, beginning three years ago, in constructing main highways through large cities.

"The day has passed", he said, "when the state or national government can build great highways up to the borders of cities and then dump an enormous traveling public onto narrow city streets to fend for themselves. That practice has created great bottlenecks in the cities, congested their streets, depreciated their land values, and by the congestion impaired the usefulness of the highways themselves. It is for that reason that the State of New York —and many of your states—have taken over responsibility for continuing great arteries of transport through the hearts or around the edges of our cities."

The Governor mentioned the necessity for rapid through transportation such as the Pennsylvania Turnpike affords. He referred also to the New York Thruway which is now being constructed from New York City to Albany, to Buffalo, and on to the Pennsylvania border.

Emphasizing the long-range responsibility of highway officials and of those in New York State in particular, Governor Dewey observed:

"We must take a long, hard look to our 1960 problems, and determine what we need, and then we must find the money to pay the bill. We must insist upon getting a dollar's worth of highways for every dollar we spend. In these days of high prices, of material shortages, or labor scarcity, government has a very serious responsibility. It must meet the needs of its people and at the same time look well to the public purse lest it open a floodgate of unwise spending and burden the people with debts or taxes which they cannot bear. The cost is staggering but the cost of failing to meet the challenge would be even more staggering."

The Governor said candidly that in New York the highway system has not kept pace with traffic requirements since 1939. He added that a recent report from New York's Superintendent of Public Works, Charles H. Sells, showed that to maintain the social and economic structure of the State of New York "we must, between now and 1960, spend the staggering total of $2,000,000,000 on highways".

President's Annual Address

Outgoing AASHO President, Judge Clarence W. Phillips, Commissioner, Tennessee Department of Highways and Public Works, made his annual address. In it he proposed that highway departments should have one central goal—service to the people. He urged highway departments throughout the country to "clean house" and remove those employees not geared to the present tempo of road building or else place them in a position of lesser responsibility.

He also suggested that in highway

(*Continued on next page*)

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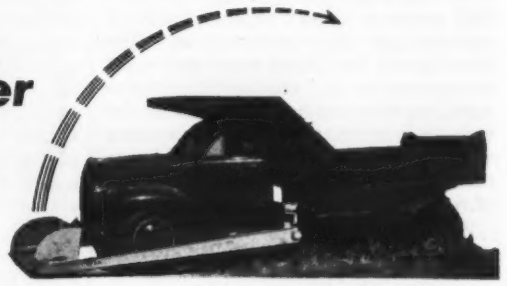

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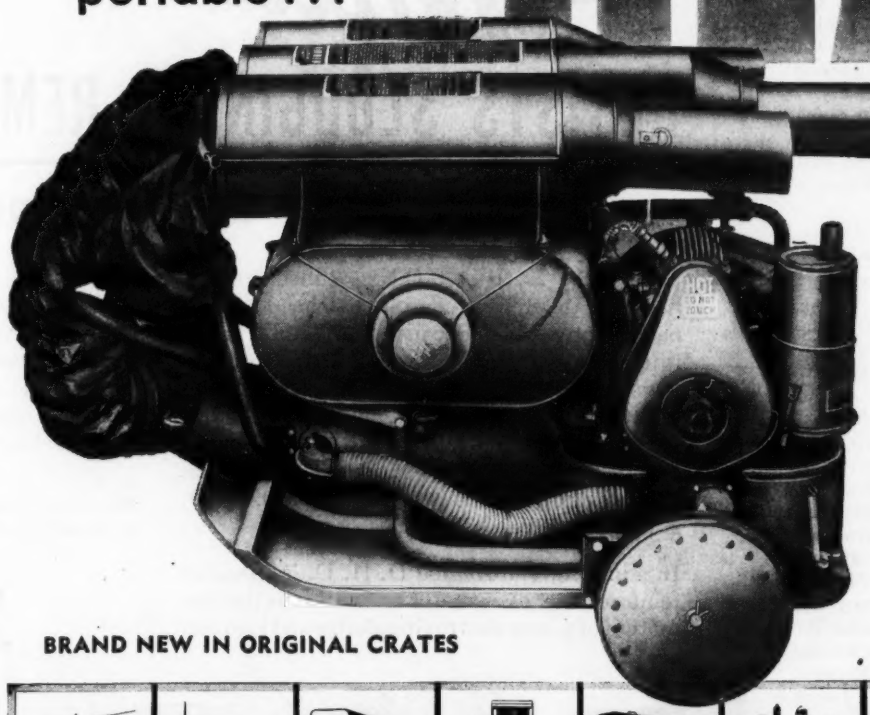

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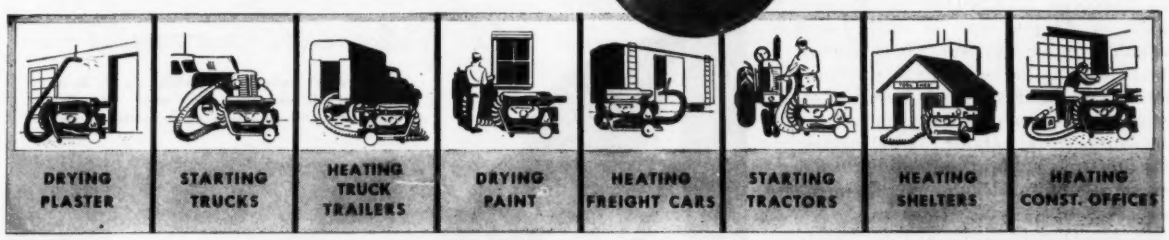

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Highway Chiefs Hold 33rd Annual Meeting

(*Continued from preceding page*)

work the departments adopt a three-fold program instead of one simply of maintenance and construction. The third phase, the Judge went on, "must be some type of betterment, replacement, or restoration in between high-type construction and maintenance which can be let to contract quickly, so that a complete loss of salvage value of a pavement is not experienced".

Judge Phillips emphasized the responsibility of engineering personnel in making every contribution possible to safety design in highways.

"One of the things", he stated, "that should be impressed upon all designing engineers is the elimination of 'mental fatigue' on the part of the driver. Our maintenance departments can help give immediate relief to this hazard by clean-cut right-of-ways and adequate shoulders and ditches and the super-elevation of curves. Irregular and unsightly patches on pavements give any driver a feeling of uncertainty—poorly marked highways and bridges tend to 'fret' drivers. A sudden curve at the end of a tangent where curves are infrequent is more hazardous than one where curves might normally be expected. 'Freedom from strain on the driver' should be the slogan of design engineers."

The morning session of the opening day concluded with the presentation of a testimonial to Past-President M. J. Hoffmann Commissioner, Minnesota Department of Highways. F. R. White, Chief Engineer, Iowa State Highway Department, made the award.

In the afternoon the convention was addressed by Senator John S. Cooper, Republican of Kentucky, Member of the Senate Committee on Public Works, and Chairman of the Subcommittee on Roads. The Senator called for a continuing highway program to extend the present Federal Highway Act and proposed that it be put into law at the next session of Congress. He stressed the need for a network of strategic roads to be in readiness for any emergency.

Thomas H. MacDonald, Commissioner of the Public Roads Administration, reported on the progress of the national highway program. Under the Federal Highway Act of 1944, already two years in effect, plans have been approved for 10,210 miles of highway construction; this involves $278,000,000 of Federal funds, or 43 per cent of such funds available under the Act. Of this work 90 per cent is under contract or completed. On the Federal-Aid secondary system, improvements have now been programmed on about 32,000 miles; this amounts to approximately 9 per cent of the total mileage included in the Federal-Aid secondary system.

Mr. MacDonald declared that despite setbacks a truly magnificent record has been made through national teamwork in the attack on highway problems. He referred to the Federal Highway Act as a "splendid concept of legislation".

AASHO 25-year awards of merit were made to 169 employees of the various state highway departments throughout the country.

Urban Problems

On the morning of the second day urban problems were discussed by a panel group. Robert Moses, New York City Construction Coordinator, presided and also spoke on "Urban Traffic". A list of proposed projects included the construction of a 4,600-foot suspension bridge across the Narrows in New York harbor. The span would have a vertical clearance of about 237 feet and would connect Brooklyn and Staten Island. The only way that Staten Island, one of the five boroughs of New York City, can now be reached from any other part of the city is by ferry.

Reviewing the growth of the parkway system in the metropolitan area of New York City, Mr. Moses mentioned the trend to expressways to serve mixed traffic, commercial and passenger, as distinguished from the restricted pleasure and passenger traffic. Expressways are essential to relieve traffic congestion in large urban areas, he said. He also mentioned two serious bottlenecks now existing in the New York area. One is the Bronx River Parkway, completed back in 1925 with sharp curves and a 4-lane-wide pavement now unsuited for modern traffic.

"This artery, although still indispensable," said Mr. Moses, "is so obsolete that the State and local authorities are confronted with two tough alternatives; tearing out all the short and narrow bridges and realigning the roadway, or finding an entirely new parallel relief route."

(*Continued on next page*)

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The other scene of serious traffic congestion is Grand Central Parkway in Queens, where four traffic lanes on a narrow strip of right-of-way have proved inadequate to take care of traffic.

"This ribbon of land was far too narrow," Mr. Moses declared, "simply because, as the State's representative at that time, I could not make the City Comptroller understand in 1929 the traffic jam which was almost upon us. As a result we have four lanes, where there should be six, and skyrocketing values have made any widening unthinkable."

B. D. Tallamy, Chief Engineer of the New York State Department of Public Works, presented a paper entitled, "Meeting the Urban Thoroughfare Challenge". According to Mr. Tallamy, New York is doing just that by preparing a master plan of state arterial-route development for each urban area of the state. Exclusive of New York City, the state has 60 cities which, with their suburban areas, vary in size from about 10,000 persons to over 1,000,000. A Bureau of Arterial Route Planning was created within the Department of Public Works to act as consultant to the District Engineers and their staffs in the preparation of these master plans.

Since 1945, final reports have been submitted for Buffalo, Dunkirk, Rochester, Syracuse, and Rome. The first two have been approved and actual construction is under way in Dunkirk. Work in Buffalo and other cities will follow in the near future. At present 19 master plans of city arterial routes are now on the drafting boards, and 48 city traffic surveys have been completed since 1945.

General J. A. Anderson, Chairman of the Virginia Department of Highways, spoke on "Arterial Highway Planning in Virginia Cities". Stressing the fact that Virginia is an average and not a large state, General Anderson explained the planning necessary for the location of an expressway system to serve Richmond, a city of 250,000 population, and its connecting highways. Bold measures must be taken, he stated, "to correct the conditions responsible for the inundation of our antiquated streets by the motor vehicle".

Also included in the morning's session was the presentation of the George S. Bartlett Award to Herbert S. Fairbank, Deputy Commissioner, Public Roads Administration.

Committees Meet

On the afternoon of September 23, meetings of 14 different association committees were held to discuss their respective problems. The Administrative Practices Committee heard Nelson M. Wells, Principal Landscape Engineer, New York State Department of Public Works, describe how New York State is handling the outdoor advertising problem. He mentioned that, in general, private owners have cooperated with the Department in either relocating or modifying their signs to meet Department recommendations. Last year over 2,000 illegal signs were removed from the highway right-of-way.

During the meeting of the Committee on Right-of-Way, Sidney M. Shapiro, Deputy Chief Engineer of the Long Island (N. Y.) State Park Commission, discussed "Right-of-Way Protection on the Long Island State Parkway System". As a general rule, the parkway right-of-way averages 300 feet wide with an overall width of 1,000 feet at intersecting crossroads where interchanges are to be established. At present the State pays for 100 per cent of the cost of land outside of New York City, and shares the cost 50-50 within the city limits. The many safety features built into this 158-mile-long system reveal a record of 2.5 fatalities per 100,000,000 vehicle-miles as against a national average of 11.5.

Highlighting the Committee on Construction meeting was a speech by Dwight W. Winkelman, Vice President, The Associated General Contractors of America, and President, D. W. Winkelman Co., Syracuse, N. Y. The topic was "Cooperative Relations Between Contractors and Engineers—The Contractor's Viewpoint".

"The relations between highway engineers and highway contractors can be

Robert H. Baldock, Chief Engineer of the Oregon State Highway Commission, is the new AASHO President for 1947-48. He was elected at the 33rd annual meeting of the Association held in New York September 22-26.

and, in the public interest, should be founded upon mutual understanding and confidence", declared Mr. Winkelman. We are not two antagonists trying to get the better of each other. We are partners in a team whose objective is to build better highways for the public.

"In days gone by some state representatives may have felt it necessary that the relations between engineers and contractors be something like a cop-and-robbers game. In my judgement, those days are gone forever. The good contractor today knows that the cheapest way to finish a job is to adhere to the specifications and perform every operation correctly the first time."

The engineer's viewpoint was expressed by Ernest L. Merrill, Principal Highway Engineer of the Maine State Highway Commission, who urged more conferences in each of the states between contractors and engineers.

"The Uncertainties and Unusual Items to Consider in the Preparation of Construction Cost Estimates" was discussed by Robert E. O'Connor, of the O'Connor Construction Co. of Fort

(Continued on next page)

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Highway Chiefs Hold 33rd Annual Meeting

(*Continued from preceding page*)

Wayne, Ind., and C. M. Hathaway, Engineer of Construction, Illinois Division of Highways.

At the meeting of the Committee on Maintenance and Equipment, seven different progress reports were submitted by subcommittee chairmen with each topic thrown open for group discussion.

The Committee on Roadside Development, of which John L. Wright, Connecticut Director of Roadside Development, is Chairman, covered a wide variety of subjects. At its first meeting Wesley L. Hottenstein, Supervisor of Highway Forestry, Pennsylvania Department of Highways, presented a paper on more immediate and effective erosion control. Methods of seeding and mulching for slope stabilization were discussed. Protection of trees from pole lines and other utilities was the subject of a paper by C. M. Keyser of the Bartlett Tree Expert Co.

David R. Levin, Head, Special Administrative Studies Unit, Division of Financial and Administrative Research, Public Roads Administration, discussed border control for the protection of highway right-of-way. Mr. Levin stressed the need for fact-finding surveys of roadside conditions, billboard locations, etc., to determine the extent to which they contribute to traffic accidents. He pointed out that such studies can be financed with the 1½ per cent Federal-Aid funds for roadside development if done through the regular Highway Planning Surveys.

Because of the present highway program of widening, relocating, and constructing new modern expressways, the problem of utility installations is a particularly pressing one. At the joint meeting of the Committees on Roadside Development and Right-of-Way, Charles M. Noble, New Jersey State Highway Engineer, described that State's procedure in dealing with public-utility installations on controlled-access highways.

A round-table discussion of current roadside-development problems conducted by Nelson M. Wells, Principal Landscape Engineer in New York State, concluded the committee's meeting. A variety of subjects was covered, with emphasis on the place of trees and shrubs in roadside development, and their preservation and care.

With Spencer Miller, Jr., New Jersey State Highway Commissioner, as Chairman of the Committee on Public Relations and Publicity, a general business session of a representative group of highway departments was held to discuss current publicity practices. Among the media used to keep the public informed and sold on sound highway programs were the press, daily and weekly; radio programs; and as one speaker remarked, "every highway department employee who comes in contact with the public".

Robert J. Shillinglaw, Director of the Bureau of Public Relations, New York State Department of Public Works, spoke briefly of acquainting the public with highway activities and programs on a community rather than on a statewide basis for the best results. (See C&E MONTHLY, May 1947, pg. 60.)

Social Activities

On Tuesday evening a family dinner and entertainment was held in the Ball Room of the Waldorf-Astoria. Wednesday morning was given over to the meetings of the various committees, continuing the work of the day before in the form of round-table discussions for the most part. No business meetings were held on Wednesday, Thursday, or Friday afternoons so that the delegates might take bus trips inspecting highways, parkways, and other public works in New York City, Long Island, New Jersey, Westchester County, and Connecticut.

Public Relations

A general session was held on Thursday morning in the form of a panel discussion on highway department public relations. Spencer Miller, Jr., New Jersey State Highway Commissioner, presided. The panel consisted of: J. Stephen Watkins, Commissioner, Kentucky Department of Highways; Kenneth Perry of Johnson & Johnson, New Brunswick, N. J.; H. S. Fairbank, Deputy Commissioner, Public Roads Administration; N. G. Shidle, Editor, SAE Journal; Charles H. Purcell, Chairman, California Department of Public Works; and G. Donald Kennedy, Vice President, Automotive Safety Foundation, Washington, D. C.

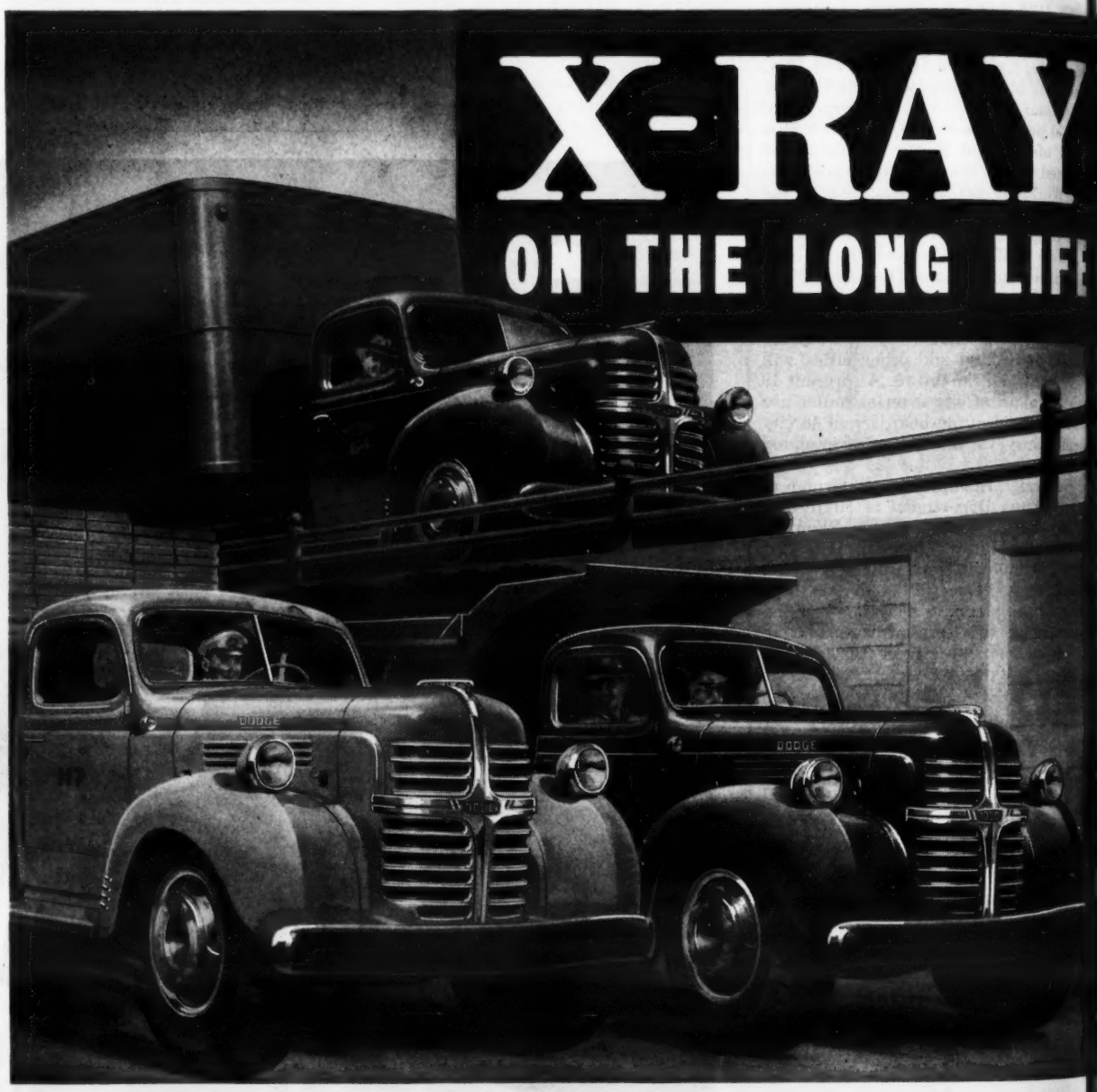
High spots of the discussion included emphasis on developing the right relationship between all sections of the community, and not just trying to please one or two pressure groups; the need for a continuing type of public relations rather than one improvised to meet a certain situation; obtaining civic participation in the highway program; the need for a broad comprehensive plan explaining to the public what is contemplated or being done; the desirability of a fact-finding study as a public-relations tool, so that the highway officials can translate the facts into words and pictures to make them easier for the public to understand.

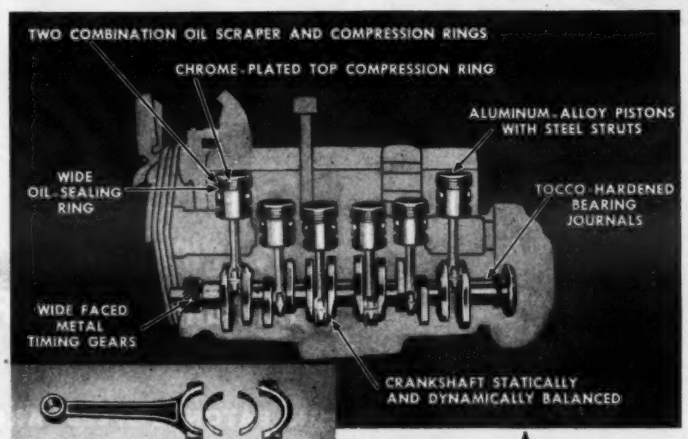
New Officers

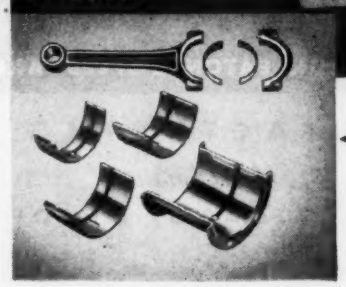
The 33rd annual meeting concluded with a business session on Friday morning at which eleven resolutions were adopted and new officers elected for 1947-48. The new President is Robert H. Baldock, Chief Engineer, Oregon State Highway Commission. Wesley W. Polk, Chief Highway Engineer of the Illinois Division of Highways, is the new First Vice President.

The regional Vice Presidents include: 1st region, Spencer Miller, Jr., State Highway Commissioner of New Jersey; 2nd region, F. Elgin Bayless, Chairman, Florida State Road Department; 3rd

(*Concluded on next page*)




TWO COMBINATION OIL SCRAPER AND COMPRESSION RINGS
CHROME-PLATED TOP COMPRESSION RING
ALUMINUM-ALLOY PISTONS WITH STEEL STRUTS
WIDE OIL-SEALING RING
TOCCO-HARDENED BEARING JOURNALS
WIDE FACED METAL TIMING GEARS
CRANKSHAFT STATICALLY AND DYNAMICALLY BALANCED



7-bearing crankshaft, with Tocco-hardened journals. Aluminum alloy pistons with four rings. Replaceable multiple-layer bearings.

Rugged, dependable rear axles—single-speed; single-speed, double-reduction, and 2-speed, double-reduction fit every hauling need.

region, Wardner G. Scott, State Engineer, Nebraska Department of Roads and Irrigation; 4th region, A. F. Winkler, Chairman, Montana State Highway Commission. George S. Henderson, Principal Highway Engineer of the Rhode Island Department of Public Works, is Treasurer. Hal H. Hale, of Washington, D. C., continues as Executive Secretary.

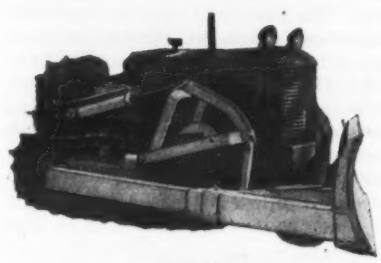
Hydro-Crane Sales Manager

The appointment of W. G. (Bill) Beriswill as Assistant Sales Manager has been announced by the Milwaukee Hydraulics Corp., maker of the all-hydraulic Hydro-Crane. Mr. Beriswill has previously been associated with the Osgood Co. and General Excavator Co.

Twin Pumps Control Tilting Dozer Blades

A hydraulic bulldozer which features the use of two pumps for lifting either side of the blade independently is made by the Drott Mfg. Co., 4344 N. Green Bay Ave., Milwaukee 12, Wis. The units are known as the Twin-Controlled tilting bulldozers and Bullangledozers. They will be sold and serviced by Oliver Cletrac dealers.

Both dozers are operated by Drott's closed hydraulic system. The twin pumps are mounted and concealed on the front of the tractor. Each pump operates a cylinder through separate valves, so that the operator can raise or lower either side of the blade from his seat, while the tractor is in motion or standing still. Other features reported by the manufacturer include close mounting of the blade to the radiator for better balance, good operator vision, and rugged construction.



The Drott Twin-Controlled Bullangledozer has two hydraulic pumps. They enable the operator to raise or lower either side of the blade from his seat, while the tractor is in motion or standing still.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

Test for Strength Of Cohesive Soils

Forward steps in the study of the soil mechanics of clay have been reported by Northwestern University's Technological Institute. Experimenters there have developed an improved method for determining the strength of clay subsoils and other cohesive soils used in engineering structures. Forearmed with this knowledge, engineers will be aided in the use of soil as a structural material in earth dams, levees, and similar construction.

The pore water pressure instrument consists of a hypodermic needle, castor oil, two photoelectric cells, a specimen of clay enclosed in a rubber membrane, and a clock-operated automatic disk recorder. Credit for the development of this device goes to Professors P. C. Rutledge and J. O. Osterberg, and graduate research assistant T. W. Van Zelst.

As the test is employed in the University's laboratory, a clay specimen 1 x 3 inches is enclosed in a rubber membrane surrounded by 1½ gallons of castor oil. The hypodermic needle is inserted in the clay, and through the use of the photoelectric cells, pressures are recorded on the disk recorder. It is from this record that important data can be used in establishing the theory for predicting the probable settlement of structures built on clay subsoils. Castor oil is used because it has no affinity for water, and because it prevents an osmotic flow through the membrane; thus it permits the scientists to observe their findings without water motion.

YEVIDENCE

FEAND ECONOMY OF

DODGE "Job-Rated" HEAVY DUTY TRUCKS

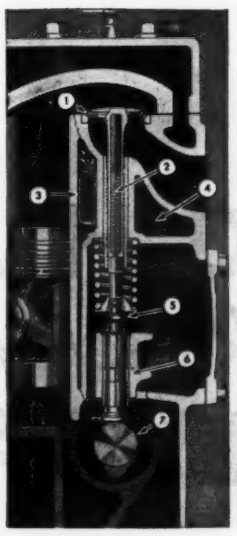
FROM radiator to rear axle, these heavy-duty trucks were especially engineered and built for *long, economical* service.

They're powered by two brilliant *truck* engines, of 282 and 331 cubic inch displacement. Horsepower-to-weight ratios reach a new high! These engines develop 225 and 270 pound-feet of torque respectively—and maintain high torque output over a wide speed range.

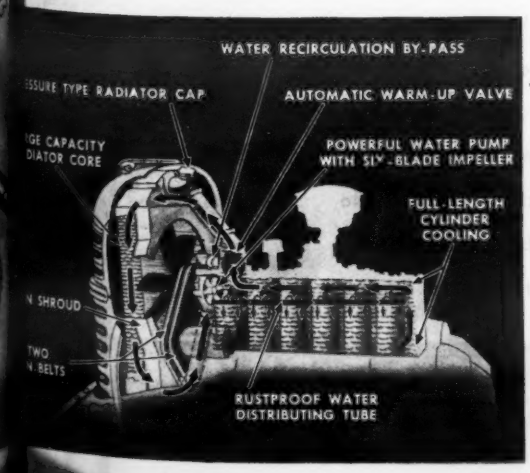
Engine cylinder walls, of chrome nickel molybdenum alloy cast iron, are *so hard* that wear is almost non-existent. Valves are made of silchrome, a special valve material of exceptional durability. For long life, exhaust valves are sodium-cooled; valves and valve seat inserts are stellite-faced.

Everywhere, unnecessary surplus weight is eliminated by improved design and advanced metallurgy. New and strictly *heavy-duty* clutches, and a remarkably efficient five-speed transmission—coupled with rear axles of entirely new design—provide a highly efficient transmission of driving torque to the wheels. Despite their husky construction and rugged strength—these trucks handle with ease, even on steep grades with capacity loads.

If *your* transportation requirements fall within the 18,500 to 23,000-pound gross vehicle weight ranges (up to 40,000 pounds G.T.W.) . . . get the complete story of these great new Dodge *"Job-Rated"* heavy-duty trucks from your Dodge dealer. We believe you'll find them your long-awaited answer to *lower-cost hauling* in their capacity ranges!

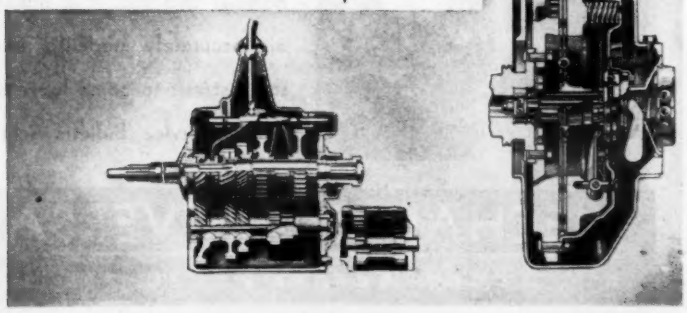


1 Stellite-faced exhaust valves and seat inserts. (All valves and valve seat inserts are of hard, durable silchrome.)
2 Sodium-cooled exhaust valves.
3 Rustproof water distributing tube for exhaust valve seat cooling.
4 Large water pockets surround valve stems for quick heat dissipation.
5 Self-locking adjusting screws facilitate tappet adjustments.
6 Tappets lubricated by pressure feed for long life.
7 High-test cast iron alloy camshaft supported by four large bearings.



This highly effective cooling system is an important reason for the greater economy, dependability, and longer life of these heavy-duty trucks.

Rugged 5-speed transmissions and heavy-duty clutches, with capacity well in excess of engine torque, insure long life, low-cost maintenance.



Electric-Plants Catalog

A 16-page catalog covering its complete line of electric plants and related accessories is offered by D. W. Onan & Sons, Inc., 39-51 Royalston Ave., Minneapolis 5, Minn. It features a discussion of how to select the proper plant for each job requirement. It tells how to choose the proper type, the right size, and the best starting method.

Catalog No. A-138 tells of the three types of plants available from Onan: ac models, direct-service dc models, and battery-charging models. It discusses plant sizes ranging from 350 to 35,000 watts ac in all standard voltages, frequencies, and phases. If dc of the direct-service type is required, sizes range in 115-volt models from 600 to 10,000 watts; and in 230-volt models, from 3,500 to 10,000 watts. Battery-charging plants are described in 6, 12, 24, 32, and 115-volt units in sizes from 500 to 6,000 watts.

Also described in this catalog are accessories for easier handling and better installation. These range from 2-wheeled dollies and guard frames to automatic-control panels and underground fuel tanks.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 75.

Rucker Co. Changes Hands

The firm formerly doing business under the name of Rucker Vaughn Co. will henceforth be known as The Rucker Co. Mr. Rucker has purchased the interest of C. S. Vaughn and now is sole owner. With the change in name, this Oakland, Calif., company is also expanding its operations into the sales and distribution of hydraulic as well as pneumatic equipment.

Among the lines now handled are cylinders and valves, compressors, regulators, lubricators, filters, drill presses, hoists, radial drills and saws, multiple drill heads, electric motors and drives.

Grading and Drainage For New Army Runway

(*Continued from page 1*)

the new construction known as the VVHB runway and taxiways. The new runway is being built in a northeast-southwest direction.

The pavement is being placed in 25-foot lanes. These are tied together by heavy, smooth, steel dowel bars which are 2½ inches in diameter x 24 inches long on 18-inch centers, and weigh 33 pounds each. Steel wire-mat reinforcing is placed 4 inches below the surface. No expansion joints are used, but contraction or dummy joints are placed on 28-foot centers. The great volume of aggregate required for the concrete is being taken from a vast gravel pit lying north of the field; it is processed there and then moved on belts to the central batch plant.

Grading

Grading operations at the airport got under way on July 25, 1946. The field was fairly level as a result of previous grading for the three existing runways A, B, and C, but considerable unsatisfactory material had to be stripped off to a depth of from 1 to 6 feet. This was replaced with suitable sand, clay, or gravel, or a combination of these materials.

Excavation usually went down to the sand and gravel stratum that underlies most of the field. When good-quality clay was found, it too was used for the subgrade. All the earth work was done with the dirt on the site. The unsuitable material was disposed of in holes from which the satisfactory sand and gravel were taken. Under the pavement the grade was compacted to a 95 per cent modified Proctor density, while outside the paved areas 90 per cent compaction density was required.

About 60 per cent of the grading was done with rubber-tired earth-moving equipment on hauls from 1,000 to 3,000 feet. Such units included 3 Tournapulls with LeTourneau LP 15-yard Carryalls; 3 Koehring Wheelers pulling LaPlant-Choate 8-yard scrapers; and 3 Caterpillar DW10's hooked to 8-yard scrapers.

The remaining 40 per cent of the earth work was handled by 6 LeTourneau 13 to 15-yard Carryalls pulled by Caterpillar D8 tractors on hauls up to 1,000 feet. Another D8 served as a pusher to assist the rubber-tired units in loading, while two D75's and two RD8's with dozers helped spread the fills in 6-inch layers or pulled the sheepsfoot rollers.

Seven sheepsfoot drums were used on the compaction. They were hooked up in various combinations of two or three to a row, or in tandem. Single units were employed in rolling trench backfill. Tank trucks supplied water to wet the fill down during compaction. From 6 to 12 per cent moisture content was usually found best to obtain the desired compaction. Actually 9-inch lifts were permitted, but it was just as easy to spread the fill in 6-inch layers; moreover, the results were considered better.

Following the sheepsfoot rollers came a Huber and a Buffalo-Springfield 3-wheel roller, 10 and 7½ tons respectively; also a Cemco rubber-tired roller pulled either by the Koehring Wheeler or the Caterpillar DW10. Two Caterpillar motor graders, a No. 12 and a No. 10, worked with the rollers in shaping the grade.

An estimated 859,000 cubic yards of earth work was involved in the contract. This included the removal of some 90,000 square yards of concrete pavement where the new construction crosses all three of the existing runways, which are from 5,500 to 7,500 feet long. This pavement removal was done piecemeal, since one runway at least had to be kept open for air traffic at the field. The concrete was first shattered with a Novo drop-hammer paving breaker mounted on a Mack truck. A Koehring 604 1½-yard shovel then loaded the rubble into trucks which wasted it in low spots over the field or in an abandoned ditch.

Drainage

The longitudinal profiles of both the runway and taxiway are fairly flat. But a typical section of the runway, which is symmetrical about the center line, shows a 1.5 per cent slope both ways from the center line. From the edge of the paved runway the dirt shoulders, topped with 4 inches of compacted topsoil, run out 200 feet to the ditch line. In the first 4 feet adjoining the concrete the shoulders drop 0.21 foot, but in the next 96 feet the slope is 1.5 per cent. The remainder of the distance to the ditch is on a slope of from 2.0 to 3.0

(*Concluded on next page*)

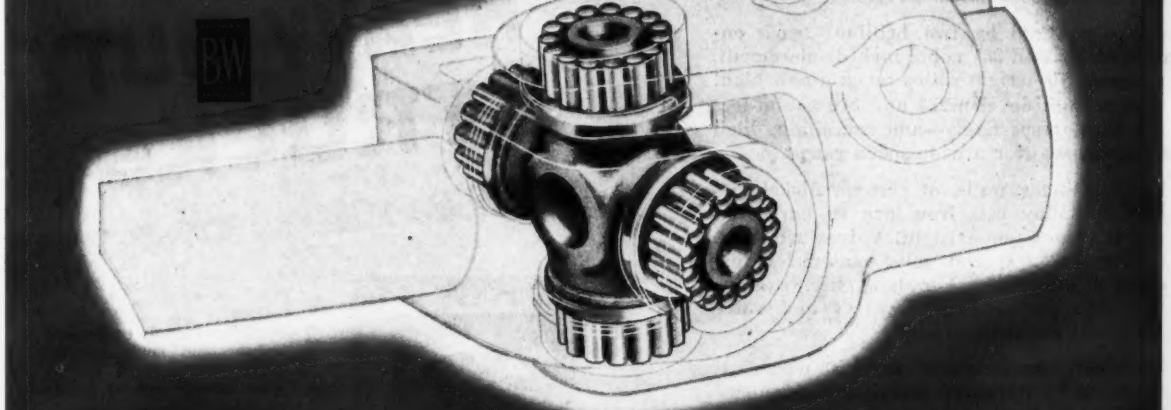
Here's the Way to Keep Tools Sharp and Clean!

Handle Many Grinding Jobs!

New postwar Van Dorn Electric Bench Grinders are packed with features that mean faster tool sharpening, grinding and cleaning. Three models, 6", 8" and 10". Equip them with Wire Wheel Brushes for cleaning all tools—with new illuminated eye shields, grinder pedestals, back-stand idlers for faster, more efficient work. Ask your nearby Van Dorn Distributor for details. Write for free catalog to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Maryland.

For Power Specify "Van Dorn" PORTABLE ELECTRIC TOOLS
DIV. OF BLACK & DECKER MFG. CO.

QUICK, EASY SERVICING Without Special Tools



MECHANICS Roller Bearing UNIVERSAL JOINTS

No special tools are needed when replacing worn parts in MECHANICS Roller Bearing UNIVERSAL JOINTS. Replacements can be made with a hammer and vise — in fifteen minutes. All parts are accurately made for interchangeability. No small screws to come loose or break. Mechanics' handy Service Bulletin sent free, upon request.

MECHANICS UNIVERSAL JOINT DIVISION
Borg-Warner • 2030 Harrison Ave., Rockford, Ill.

per cent. The backslopes to original ground are graded to 2.0 to 10.0 per cent lines.

The taxiway parallels the runway to the south with 1,100 feet of field between. Over most of it the pavement is pitched in to the field on a 1.5 per cent slope. All surface water will then drain off the concrete down a 100-foot shoulder on a 2.0 to 5.0 per cent slope to the ditch line. At its eastern end the taxiway curves north to connect with the runway. In this transition, to be used as a warm-up area, the pavement widens out to 300 feet. At about the mid-point of the runway, another connection is made to the taxiway with a 150-foot concrete pavement known as the connecting taxiway.

In the ditch lines off both the runway and taxiway, concrete pipe from 12 to 84-inch diameter has been laid 4 to 10 feet below ground level. For the smaller-sized pipe, trenches were dug with three trenching machines — a Cleveland, a Buckeye 12, and a Parsons 125. For the large trenches two 301 Koehrings, one 604 Koehring, and a Northwest dragline, with ¾-yard buckets, were used since the banks had to be laid back when digging through the unstable gravel stratum. The nearly 6 miles of pipe required for drainage was furnished by Price Bros. Co. at Dayton, Ohio. The crane booms lowered the larger pipe sections into the trenches.

The new drainage system also includes 97 inlets, 11 manholes, and 8 junction boxes. The original drainage layout had to be modified; this entailed the removal of 78 structures, inlets, and manholes, and over 10,000 feet of 12 to 48-inch concrete pipe. As the new drainage system leaves the field, the concrete pipe gives way to open ditches which eventually flow into the Mad River.

Giant Project

Aggregate production, the batching plant, and the concrete paving of runway and taxiway, are described in the accompanying sections of this article, starting on page 1. When completed, the 10,000-foot runway and 8,000-foot taxiway with connections will cover with concrete an area of 108.5 acres. If all this concrete were laid as a highway 22 feet wide having a slab thickness of 9 inches, it would stretch for over 100 miles. The contract also includes electrical work, involving the laying of some 27.5 miles of duct, and 32.5 miles of cable.

As stated before, the new runway is being constructed primarily for the Consolidated Vultee B-36, the world's largest land-based bomber. Powered by six Pratt & Whitney pusher-type engines, each developing 3,000 hp, the B-36 can carry a 10,000-pound bomb load 10,000 miles. It has a maximum speed of over 300 mph, is 163 feet long, and has a wing span of 230 feet.

Items and Personnel

The major items included in the $4,059,940 contract are:

Earth work, excavation and borrow	859,000 cu. yds.
Concrete-runway pavement, 21-inch	336,933 sq. yds.
Concrete-taxiway pavement, 25-inch	187,435 sq. yds.
Dowel bars, 2½ x 24-inch	141,000
Topsoiling	31,430 lin. ft.
Fertilizing, seeding, and mulching	171 acres

The W. L. Johnson Construction Co. of Columbus, Ohio, is represented on the project by the following key personnel: Fred I. Rowe, Partner and General Manager; Ralph Beerbower, Resident Manager; Richard Tangeman, Batch-Plant Superintendent; R. W. Craig, Grading Superintendent; P. S. Scott, Drainage Superintendent; L. P. Thiel, Electrical Superintendent; and D. H. Criswell, Paving Superintendent.

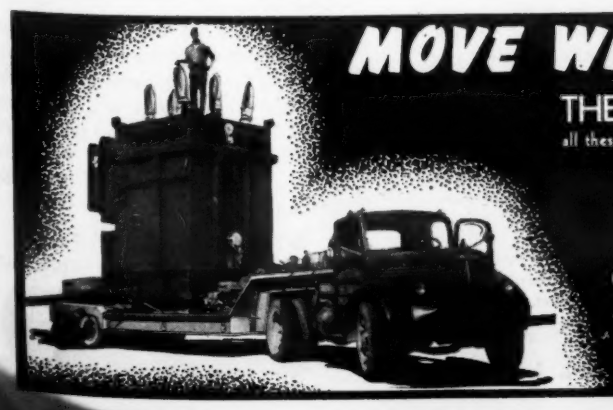
For the Department of Army, Corps of Engineers, Major O. M. Haney is Officer-in-Charge with headquarters at Wright Field. Field supervision is exercised by F. G. Dyer, Project Engineer, with James L. Alexander as Assistant Project Engineer, Peter J. Clemens as Concrete Technician, together with an additional 22-man inspection force. The Louisville Engineer District, which is directing the work, is headed by Col. B. B. Talley, District Engineer.

Regular lubrication with wisely selected greases will keep your machines operating efficiently and profitably.

The Iowa Line *of Material Handling Equipment Includes*

ROCK AND GRAVEL CRUSHERS · BELT CONVEYORS—STEEL BINS · BUCKET ELEVATORS · VIBRATOR AND REVOLVING SCREENS · STRAIGHT LINE ROCK AND GRAVEL PLANTS · FEEDERS—TRAPS · PORTABLE POWER CONVEYORS · KUBIT IMPACT BREAKERS · DRAG SCRAPER TANKS · WASHING PLANTS · TRACTOR-CRUSHER PLANTS · STEEL TRUCKS AND TRAILERS · PORTABLE STONE PLANTS · PORTABLE GRAVEL PLANTS · REDUCTION CRUSHERS · BATCH TYPE ASPHALT PLANTS

For details on Cedarapids crushers, ask for Bulletin CC-1 or see your nearest Cedarapids dealer.



MOVE WITH THE BEST—

THE LA CROSSE IS THE BEST — It combines all these features into a line of heavy-duty trailers to fit any need:

- Wide Base Rims
- All Welded Construction
- One Piece Main Beams
- 12½ x 6 — ¾" Brake Lining

Compare The Cost — Then Look To La Crosse.

Dealers — 48 States

HEAVY DUTY LA CROSSE LA CROSSE, WISCONSIN

Change of Address

(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York 16, *today*)

From _____
(Former Address)

To _____

_____

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(New Address)

_____

_____

Name _____

Firm _____

Position _____

The new Heiliner-tractor is shown with a Heil Model MW-18 bottom-dump wagon, which has a struck capacity of 13.5 cubic yards and a heaped measure of 18 cubic yards.

Two-Wheel Tractor Pulls Wagon, Scraper

A 2-wheel tractor for use with a scraper or dump wagon has been announced by The Heil Co., 3000 W. Montana Ave., Milwaukee 1, Wis. Known as the Heiliner, it features the exclusive Heil Hydro-Steer, said to give steering ease equivalent to that of a passenger car and to eliminate snaking or hunting.

Power is provided by an International Harvester No. UD-18A diesel engine which develops 150 hp at 1,900 rpm. The Model No. 2H700 tractor has a Fuller transmission providing 4 forward speeds plus an overdrive and reverse. Maximum forward speed in overdrive is said to be 20.75 mph.

Air-operated brakes are of the internal two-shoe Servotype, foot-pedal-controlled for unified action, and individually hand-controlled to assist in steering. High-traction lug-type tires are used, 21:00 x 29, 20 ply. Overall length of the tractor is 14 feet 9½ inches; width, 9 feet ⅞ inch; height, 9 feet 8½ inches; and tread, 82 inches. Approximate weight, 16,500 pounds.

Recommended by the manufacturer for use with the Heiliner is the Model OC-MS-16 scraper which has a struck capacity of 13.1 cubic yards, and a heaped capacity of 16.4 cubic yards. The Heil Twin-Cable scrapers feature a low center of gravity and low cable loads. Their tilting floors are said to produce a clean discharge of the load. Hinged back of the cutting blade, this tilting floor is said to sweep and push the load out of the bowl and at the same time to clean the back and sides.

The front apron is operated by the same cable as the floor. The cutting bit and its supporting bed are permanently attached to the bottom side of the bowl. The bowl proper raises in a vertical plane permitting adjustment for digging, spreading, and finishing. Depth of spread is 24 inches. The scraper has a 22-foot 4-inch wheelbase and a tread of 90¾ inches.

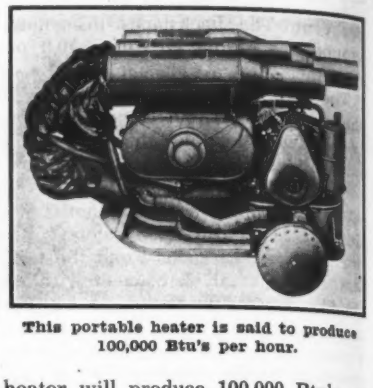
The Model No. MW-18 bottom-dump wagon has a struck capacity of 13.5 cubic yards, and a heaped measure of 18 cubic yards. The wagon features power-operated doors which open on the clamshell principle. They swing from heavy trunnions at the front and rear ends outside the hopper body; they close by gravity. Clearance with the doors closed is 26 inches and 35 inches with them open. Wheelbase of the wagon and No. 2H700 tractor is 21 feet 4 inches. Tread of the wagon is 105 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 50.

War-Surplus Heaters Offered For Re-Sale

A 250-pound portable heating plant developed by Stewart-Warner for arctic use by the Army and Navy has been listed as war surplus. The Ennis Supply Co., 324 No. 1st St., Minneapolis, Minn., has secured this surplus and is offering it for re-sale. Ennis says that these heaters are brand new and fully backed by a guarantee of satisfaction.

According to the manufacturer, the heater will produce 100,000 Btu's per hour on 1¼ gallons of gasoline. It is equipped with three ducts, one 16 feet long and two 10 feet long. The heaters can be used for heating and drying jobs, as an aid in starting tractor and truck engines on frigid days, and for piping heat to a point where it is needed.



This portable heater is said to produce 100,000 Btu's per hour.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 13.

Exteriors of Radiator Cores Need Cleaning, Too!

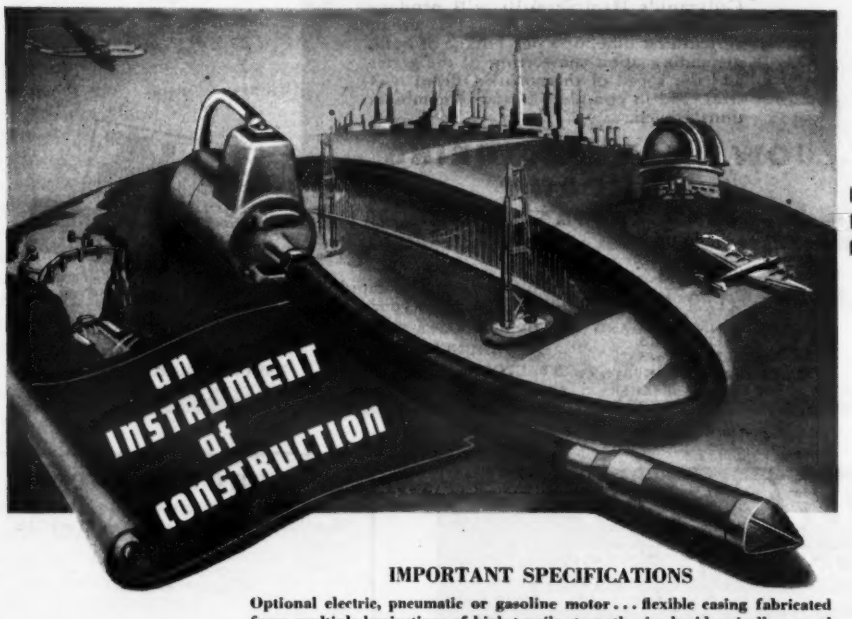
AND that's where Oakite Steam Detergent cleaning can get you out of a lot of trouble. So, next time cooling water temperature jumps above normal, check those radiator cores. If deposits are impeding air intake, blast them off with Oakite steam cleaning.

This widely-used technique combines heat, powerful impact and the vigorous action of dirt-loosening Oakite cleaning materials to rip through locked-on dirt, road muck, oil, grease, insects and the like. With surfaces clean, air intake steps up to maximum; water temperature returns to normal. Send letterhead request for helpful information about the Oakite Gun, Oakite cleaning materials and the Oakite methods sure to save you cash on all your cleaning jobs. No obligation.

OAKITE PRODUCTS, INC.
12 Thames St., NEW YORK 6, N. Y.
Technical Service Representatives Located in Principal Cities of United States and Canada

OAKITE MATERIALS METHODS SERVICE

Specialized Industrial Cleaning



The World's Largest Projects have Proved the Merit of
VIBER VIBRATORS!

ENGINEERS AND CONSTRUCTION MEN AGREE VIBER VIBRATORS REDUCE CONSTRUCTION TIME AND COST!

To obtain maximum density and strength in concrete, it is important that the entire mix be given internal high speed vibration. This reduces voids, honeycombs, shrinking and cracking, also placing and compaction time. Built to withstand the strain on heavy construction jobs, the VIBER Vibrator makes practical the use of drier mixes. The interchangeability of VIBER units permits quick conversion to changing job conditions, eliminating delays, and the light weight portability offers easy one-man operation.

Important facts and specifications on VIBER Vibrators furnished upon request.

IMPORTANT SPECIFICATIONS

Optional electric, pneumatic or gasoline motor . . . flexible casing fabricated from multiple laminations of high tensile strength wire braid, spirally wound fabric, covered with tough, live rubber . . . interchangeable flexible cores of high quality steel . . . Vibrators made from heat treated alloy steel with hardened outside surface (weight assemblies mounted on ball bearings) . . . motor bearings sealed and packed with lubricant at factory, need no further lubrication; weight assemblies mounted on open type, single row, radial bearings; and splash system oil-bath lubricates the bearings and dissipates the heat . . . an instrument of quality and durability.

VIBER COMPANY EST. 1931
ORIGINATORS OF INTERNAL CONCRETE VIBRATION
724 S. FLOWER, BURBANK, CALIF.

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Manganese
A low cost AC-DC electrode

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Hot-Mix Paving Laid On Highway to Dam

S. J. Groves & Sons Co. Completes Modern Road in Time to Tie in With First Garrison Dam Contract

✦ FOURTEEN miles of modern high-speed access highway, rapidly nearing completion, marks the second major contract to be finished in connection with the construction of Garrison Dam in North Dakota. Built for the Garrison District Office of the Corps of Engineers at a cost of $1,040,000, the new highway will carry automotive traffic from U. S. 83 westward to the gigantic dam destined soon to rise above the Missouri River valley floor.

Running straight as a die in long tangents towards the dam, the new highway is 36 feet wide with a 24-foot-wide surface of asphaltic concrete, laid down in a 2-inch binder and a 1½-inch wearing course. The roadway is armored all the way to the outside of its compacted-gravel shoulders with MC-1 and chips.

It was originally planned by the Army Engineers as a portland-cement concrete slab. But the wearing surface was changed to asphaltic concrete by a change order, because it was decided that the same result could be achieved with asphaltic concrete at a great saving in cost to the Government.

Completion of the access highway coincided with the end of two other preliminary contracts. The first-stage construction of the town of Riverdale, a housing settlement for Government engineers on the dam, was recently finished. So were the piers of a service bridge across the main stem of the Missouri River at the lower toe of the dam, and erection of the structural steel is under way.

The access highway was started on May 2, 1946. Placing of the asphaltic-concrete surface was under way when CONTRACTORS AND ENGINEERS MONTHLY'S Western Editor visited the dam in mid-August, and the road was scheduled for final completion this month.

Continuing Contract

The contract let to S. J. Groves & Sons Co. of Minneapolis, Minn., was the continuing type of Government contract under which, after an initial allotment of funds, continuation and completion of the work were contingent upon the appropriation by Congress of necessary additional funds for it.

When the design was changed from portland-cement to asphaltic concrete, the sub-base was thickened from 6 to 8 inches. The upper 2 inches was put on while Groves' crews were waiting for an appropriation to come. It was this brand of heads-up contracting which permitted the job to roll through on time in the working season of 1947.

Another factor which entered into this time saving was a half-mile-long runway near the Groves field office. Frank Groves has his personal airplane and visits work from North Dakota to New York about once every two weeks. The decision to go ahead without waiting for the appropriation and exceed the wording of the specifications was made on the spot.

Grading Shows Interesting Soil

Grading the 14-mile-long embankment exposed some good and bad fill material. One of the best earth formations in the entire northwest, known as the Fort Union stratum, was found. The Fort Union formation, a silty to sandy clay, is found in place with a moisture content of from 16 to 28 per cent. This dampness is so near to optimum that Groves put Fort Union material in the embankment without adding water, or without aerating, and densities from 96 to 98 per cent of laboratory highs were recorded constantly.

The Fort Union formation has no apparent factor of swell, and goes into the fill with no appreciable volume change over that of its natural state. With great formations of this material available near by, Army Engineers plan to use it to build the dense impervious core of the 75,000,000-cubic-yard earth-fill dam, the biggest one of its kind in the world.

To cut and shape the embankment, Groves used 2 of LeTourneau's new Model B-31 Tournapulls with electric controls, a Model C Tournadozer, 11 Super C Tournapulls, 3 LeTourneau Model W Carryalls, and 3 Model FU Carryalls, all with Caterpillar D8 power. The contractor also used 5 Caterpillar D8's with pusher plates or bulldozer blades for leveling or borrow-pit assistance.

(Continued on next page)

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SEALTEX curing concrete lined river bed. Flood Control Project — Corps of Engineers

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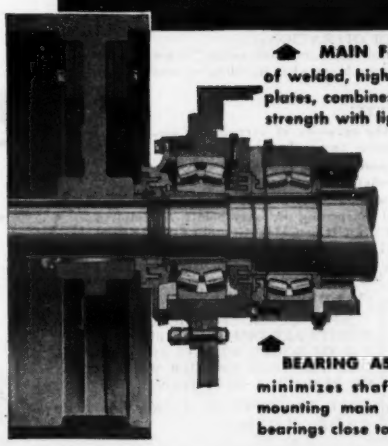

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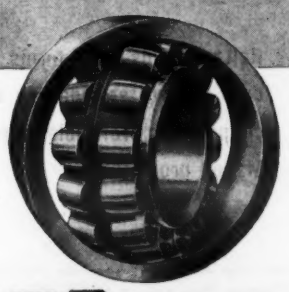

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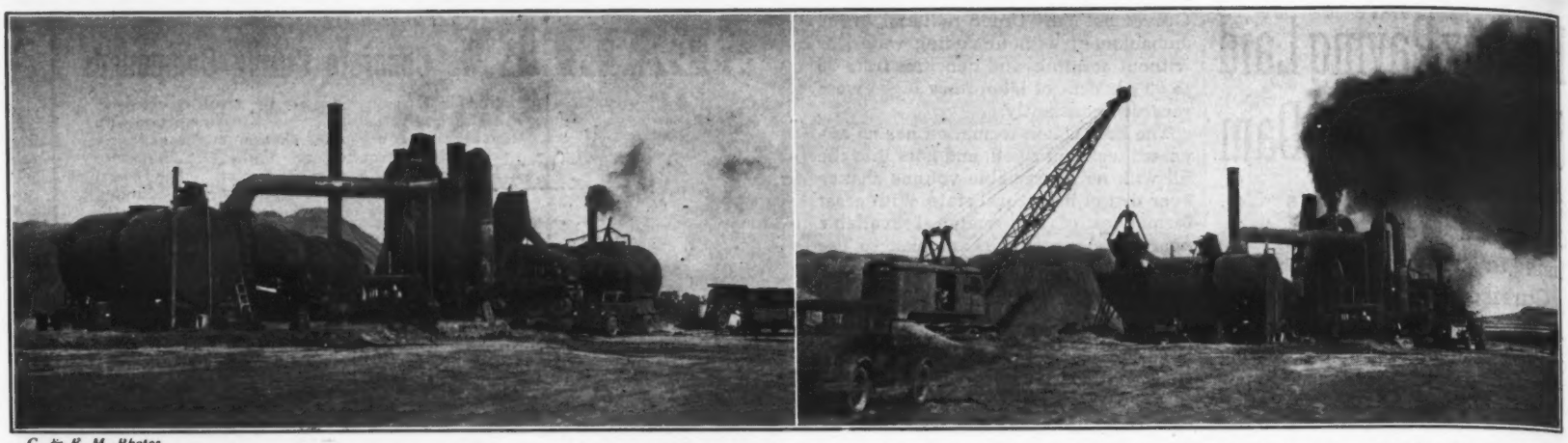

C. & E. M. Photos

S. J. Groves & Sons Co. used the Barber-Greene Model 848 hot-mix asphalt plant pictured above to produce asphaltic concrete for the 14-mile access road built to carry heavy traffic to Garrison Dam—destined soon to rise above the Missouri River Valley floor in North Dakota. At right, a Northwest Model 6 crane and 2-yard Wellman clamshell bucket feed the continuous-mix plant.

Hot-Mix Paving

(Continued from preceding page)

The dirt quantities were not balanced, and 500,000 yards were taken from one borrow pit to build the high roadway fill along the downstream toe of the dam. Altogether the highway job contained 1,354,000 cubic yards of unclassified excavation, and 133,000 cubic yards of special pervious material placed in the Missouri River valley fill at the bottom of the dam-toe fill, to serve for drainage purposes.

The dirt was put down in 6-inch layers in the presence of Government inspectors, and rolled before the moisture could dry. Ten passes of a sheepsfoot roller were necessary to comply with the specifications; beyond that, the Government paid for extra rolling. However, the ten passes gave densities in the high 90's. And last winter the fill resisted frost action which penetrated about 27 inches through the dirt, without losing any more than 1 to 2 per cent of its density.

Auto traffic used the completed sections all winter. And during the spring frost break-up only two minor soft spots appeared, both less than 8 square yards in area, according to government inspectors and the contractor's Superintendent on the job. They were repaired by digging down to firm material, tamping in new material, and compacting new sub-base material.

According to the men who built it, the excellent results in holding this super-tight highway embankment in the raw would appear to refute the theory that high densities are a waste of money in freezing country.

Test pits were dug down through the fills this spring to original subgrade. They showed no settlement of the sub-base gravel and little, if any, loss of density in the Fort Union material.

Crushing Plant Erected

The sub-base gravel was produced in a natural pit some 2½ miles below the dam site in the river bottom by an all-Pioneer crushing, screening, and sand-washing plant. The fines in the sub-base formula were used in lieu of the

(Continued on next page)

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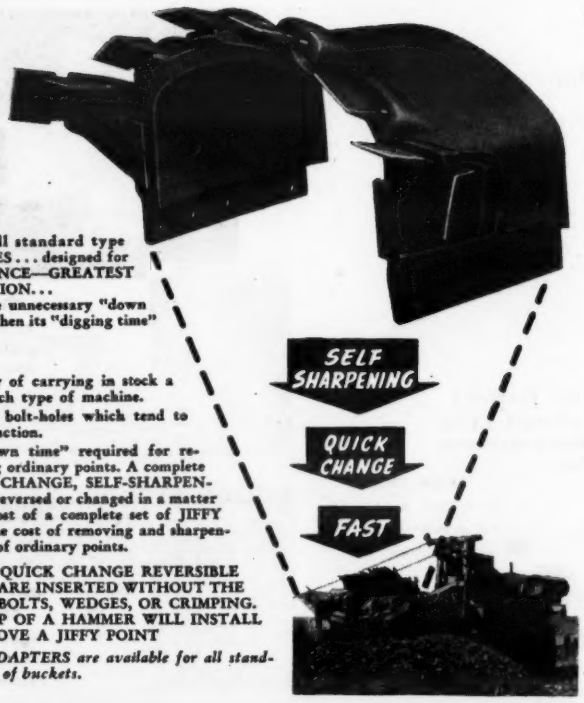

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usual clay binder on highway work, and apparently have done the work well. Sub-base material was crushed to the following sieve requirement:

Size Screen	Per Cent Passing
1¼-inch	100
¾-inch	70-100
⅜-inch	40-65
No. 10	22-45
No. 28	15-33
No. 48	10-25
No. 100	3-15
No. 200	2-8

Stockpiles of the 35,000 tons of sand and crushed-rock mineral in the asphaltic concrete were also produced and trucked over about 400 feet to where the hot-mix plant was later set up. And material for the stone-chip course was produced and stockpiled. Production with this huge war-surplus Pioneer crusher was often as high as 380 tons an hour, and one day the figure reached 386 tons an hour, an all-time high.

Screen gradation requirements on the other material were as follows:

Size Screen	Per Cent Passing Binder Course	Per Cent Passing Wearing Course
1-inch	100	. . .
¾-inch	76-100	100
½-inch	60-97	86-100
⅜-inch	47-95	75-97
No. 4	30-89	55-91
No. 10	20-79	40-80
No. 40	10-50	22-51
No. 80	6-30	12-32
No. 200	3-10	4-10

The crushed sub-base rock was hauled out to the job by a fleet of rented dump trucks, laid down in 3-inch lifts, watered, and rolled down tight by sheepsfoot and Bros Wobble-Wheel pneumatic rollers, heavily ballasted.

Hot-Mix Plant Arrives

A new Barber-Greene Model 848 hot-mix asphalt plant was delivered to the job early this year. It was set up near the crusher with the mineral stockpiles in easy reach of a Northwest Model 6 crane and 2-yard Wellman clamshell bucket assigned to feed the continuous-mix plant.

Asphaltic cement with a penetration factor of 120-150 was selected for the mix, following closely the practice and recommendations of the North Dakota State Highway Department for bituminous pavements in this severe climate. It was shipped by rail from Wyoming refineries to a rail siding at Coleharbor, N. Dak., about 15 miles from the plant.

It was then transferred to the Barber-Greene plant storage tanks by a 3,500-gallon tanker truck. The cars were heated by a Cleaver-Brooks tank-car heater at the Coleharbor siding to the point where the asphalt would flow. Then they were boosted to about 340 degrees by a Bros steam booster, which also transferred the hot asphalt to the tank truck.

After a 15-mile journey to the plant, the asphalt was then transferred to two 12,000-gallon horizontal steel asphalt-storage tanks by a Wisconsin-driven Viking 4-inch asphalt pump. The tanks were so set up that asphalt could be pumped into either one, or asphalt could be interchanged between tanks.

C. & E. M. Photos

A Barber-Greene Tamping-Leveling Finisher lays down a 2-inch binder course of hot-mix on the Garrison Dam access road. At right, Tony Vogelsberg and his father, P. A. Vogelsberg, General Superintendent for S. J. Groves & Sons Co., watch operations.

Ordinarily, while a tank was being charged by the tank truck, the plant ran from the opposite tank on which the application heat of 375 degrees was maintained.

Other tank storage facilities at the plant included a 12,000-gallon steel tank which held heavy No. 4 fuel oil for the drier burner, a 1,000-gallon diesel-fuel tank, and a 2,500-gallon water truck which hauled water for the boiler. The heavy fuel tank and both asphalt tanks were connected through steel tubing to the Kewanee 125-hp

(*Continued on next page*)

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FORCE-FEED LOADERS

Hot-Mix Paving

(*Continued from preceding page*)

steam boiler. Steam-jacketed lines kept the asphalt hot after the hot bitumen left the heated storage tanks.

The horizontal locomotive-type boiler served only one other function. It furnished steam for the atomization of No. 4 fuel, roaring at high speed through the feeder nozzle of the drier burner.

The new Barber-Greene plant had two other main auxiliary sources of power. A Caterpillar D13000 diesel engine ran the trommel drier, the cold elevator, one hot elevator, and the dust-collector fans. A Caterpillar D8800 diesel engine was used to power the pugmill mixer, one hot elevator, the vibrating separating screens, and the asphalt pump on the pugmill.

Material Movement

Aggregate moved through the Barber-Greene plant in a short, straight-line route. Fed to a 20-ton feeder hopper by the Northwest Model 6 crane, it was raised to the drier by a cold elevator. As much surface moisture as possible was dried off the aggregate by continuously mixing the outer dry aggregates with the wetter material on the inside of the pile. The clamshell operator was so good that he fed the initial bin while a man stayed on top to keep the material poked down to the feeder.

The aggregate was heated to a temperature of 350 degrees in the single 21 x 8-foot trommel drier, removing all the moisture. Two hot elevators, completely inclosed, then raised the rock up to a triple-deck vibrating screen. The material was screened to a 3-bin separation process for the binder course, with a 4-bin separation for the wearing course. On the binder-course run, a 1-inch scalper deck was used, with ⅜ and No. 8 screens on the other two decks.

The rock then entered the pugmill to be mixed with metered asphalt, which moved in a continuous loop through steam-jacketed lines from storage tanks to the pugmill asphalt pot. The continuous mix was proportioned according to this formula:

Mineral	
No. 1 (sand)	30.5 per cent
No. 2 (sand)	20.5 per cent
No. 3 (¾-inch)	22.2 per cent
No. 4 (to 1-inch)	26.8 per cent
Bitumen	
120-150 penetration	5½ per cent by weight

All batch trucks used to haul the mixed material out to the job were rented locally, and almost all makes were represented. When the job was visited, hot-mix was being transported about 11 miles one way, and 19 trucks were being used that day. Trucks took on as much as they could carry in their beds, generally around 8 tons. The loads were weighed out on a set of Fairbanks-Morse platform scales by Army Engineer representatives, and a ticket given to the driver.

Truck beds had to be oiled about three times a shift, but the heat loss from plant to job was only about 20 degrees, even though the loads were not covered by tarpaulins. With a theoretical capacity of 119.1 tons of material per hour, the plant operated nicely at from 105 tons to 115. Reduction from rated capacity was caused by a slowdown of drying when quantities of very damp rock had to be introduced in spite of all attempts to surface-dry as much of the material as possible.

Placing Hot-Mix

Of the 14-mile roadway built by S. J. Groves & Sons Co., about 11 miles received the asphaltic-concrete surface treatment. Just prior to placing of asphaltic concrete, the compacted aggregate was bladed smooth by a Caterpillar No. 12 motor grader, and rolled by pneumatic and smooth-wheel rollers. A prime coat of MC-1 asphalt was put on by a Rosco distributor at a temperature of about 160 degrees to get the required penetration of ½ to ⅝ inch. The prime was applied at the rate of 0.3 gallon per square yard, about a mile ahead of paving. It was allowed to cure 48 hours.

C. & E. M. Photo

As soon as the asphaltic concrete put down by the Barber-Greene Tamping-Leveling Finisher up ahead would support the weight of a roller, this 10-ton tandem Buffalo-Springfield made an initial roll. Then, when the mix was more stable, it made about six passes to compact the cake.

Since the prime coat extended 6 inches on either side of the surface, the asphalt had to be put down in a 12-foot-wide strip, following that application with 7 and 6-foot shots.

The hot-mix arrived from the plant on trucks which traveled right up against the permissible speed of 40 miles an hour (so set for safety), and as the loads arrived they were dumped to the hopper of a new Barber-Greene Tamping-Leveling Finisher. Since this machine put the material down with about 80 per cent of its compaction attained ahead of the roller, allowance for compaction was not more than ¼ inch on the binder course. The thickness, of course, was controlled by geared settings on the screed.

Tending the Barber-Greene machine was a foreman, a machine operator, a roller operator, a dump man, two rakers, and a screed man. When the machine was brought in to the job in midsummer, experienced paving men were difficult to find, and with the exception of the rakers a whole new crew was hired and broken in.

The mechanical perfection of the

(*Concluded on next page*)

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*Of course, in certain complicated layouts, or if you already use Atlas Forms, this may not hold — but on the average, it's a fair statement.

finishing machine made it possible for this crew to go ahead, inexperienced as it was, and lay the asphaltic concrete about as fast as the plant, under more experienced help, could put it out. Army Engineer surveyors set stakes every 50 feet to mark the location of a string line, used as a guide to keep the finisher in perfect alignment.

As soon as the asphaltic concrete would support the weight of the roller, a 10-ton tandem Buffalo-Springfield was put on the strip to make an initial roll. Then when the mix had attained a little better degree of stability, the wrinkles were all ironed out and the cake compacted by about six passes of the 10-ton machine. The mat was laid in such a way that a hot joint was maintained at all times, except at the end of the day's work, when the joint was formed square with a piece of timber.

On the adjoining 12-foot strip, the center joint was eliminated by heavy longitudinal rolling first along the joint line, immediately after the finisher had laid the material down.

The compacted-gravel shoulders were put in after the asphaltic concrete had been laid, and the entire highway topped off with an armor coat of MC-1 and stone chips under ⅜ inch in size.

Heavy Traffic on Highway

The access highway just finished will have to handle much heavy traffic. It is bound to be watched with interest by highway engineers in North Dakota and neighboring states. For heavy loads of truck-borne supplies will move in over this highway, as will the automobiles of personnel who will work on the mammoth earth-fill barrier.

The first contract for 11,000,000 cubic yards of excavation and earth fill—only a small chunk of the great dam—was recently awarded by the Corps of Engineers to a combine of Memphis, Tenn., contractors on the low bid of $6,349,830. The contract went to H. N. Rodgers & Sons, Forcum-James, and S. K. Jones Construction Co. This first contract also includes driving and lining a test diversion tunnel and driving about 380,000 square feet of sheet piling.

Garrison Dam is the second mighty structure to control a mighty stream. Fort Peck Dam is finished. The famous Pick-Sloan plan, conceived jointly by the Army Engineers and the U. S. Bureau of Reclamation, envisages 105 dams on the Missouri and its tributaries before the undertaking is finished and the river controlled for all time.

Personnel

The work is now under the general supervision of Colonel John S. Seybold, USA. He recently replaced Colonel W. W. Wanamaker, dam engineer who carried the project through its initial development stages. A. F. Arrington is the Army Resident Engineer on the job.

The access highway was built under the supervision of F. A. Vogelsberg, General Superintendent for Groves, with Al Koalska as Excavation Superintendent, George Gillett in charge of crushing and hot-mix plants, and J. L. McBride as Paving Foreman.

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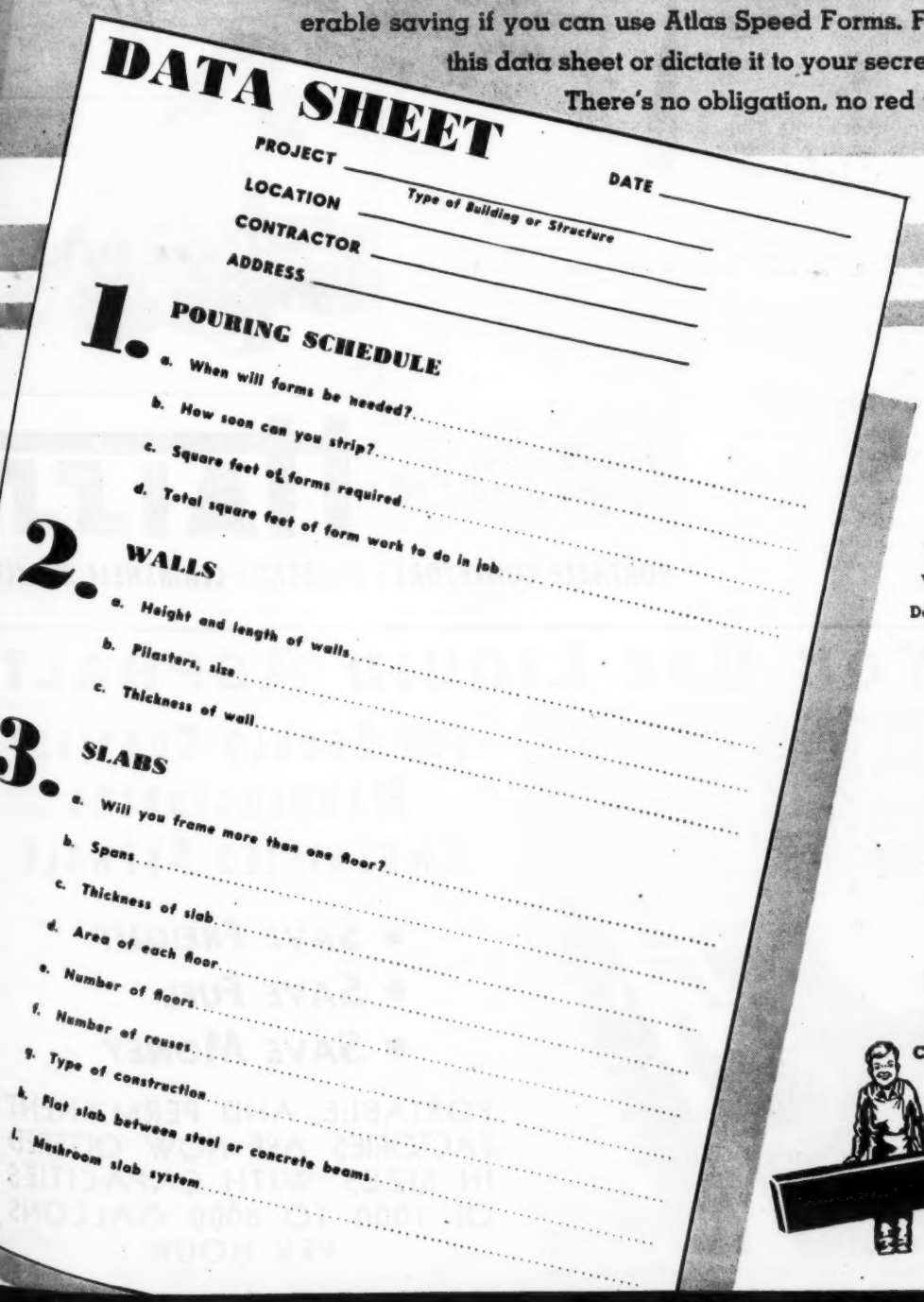
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LOCATION
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CONTRACTOR
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1. POURING SCHEDULE
a. When will forms be needed?
b. How soon can you strip?
c. Square feet of forms required
d. Total square feet of form work to do in job
2. WALLS
a. Height and length of walls
b. Pilasters, size
c. Thickness of wall
3. SLABS
a. Will you frame more than one floor?
b. Spans
c. Thickness of slab
d. Area of each floor
e. Number of floors
f. Number of reuses
g. Type of construction
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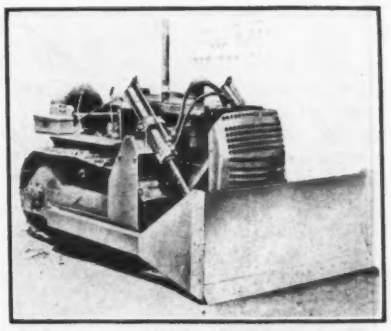


This is one of the new double-acting hydraulic bulldozers made by Bros for the Caterpillar D4 tractor. All units in the new Power-Plus line incorporate LaPlant-Choate hydraulic pumps.

New Dozers Feature Fluid Power Control

A newly designed hydraulically controlled bulldozer featuring fluid power control has been put on the market by the Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave., So. E., Minneapolis, Minn. It is made in straight or angle models to fit Caterpillar D4 and D6 track-type tractors. Standard equipment includes a hydraulic pump made by LaPlant-Choate, whose engineers cooperated with Bros in designing the new Power-Plus line. The hydraulic system combines pump, valve, and oil reservoir into a single unit.

Advantages claimed for the rigid frame with floating moldboard of these dozers include: great strength, offset pivot pin for clearance, easy removal of main frame and blade, reversible cutting edge, and correct blade curvature. On the straight models, a new reinforced fantail box construction is said to eliminate the multiple welded pieces previously used. It is offset from the push frame and made wider for improved maneuverability and a minimum of wear.

The straddle-mounted cylinder bracket assembly is designed to center lifting power and to distribute equally all the working forces. The full-floating hydraulic cylinder assembly permits free movement in all directions. This tends to eliminate rod bending, piston cramping or scoring, and undue wear on piston rings and wall. Fabric piston rings, impregnated with Neoprene, are said to take all the wear and to provide a sealing action. According to the manufacturer, the adjustable chevron packing provides an automatic hydraulic seal, preventing oil slippage and leakage.

The D4 models have full-floating trunnion rams, and their hydraulic pumps can be front or rear-mounted. D6 units are front-mounted only. The hydraulic pump used on the Bros Power-Plus line of dozers can be completely serviced with a crescent wrench.

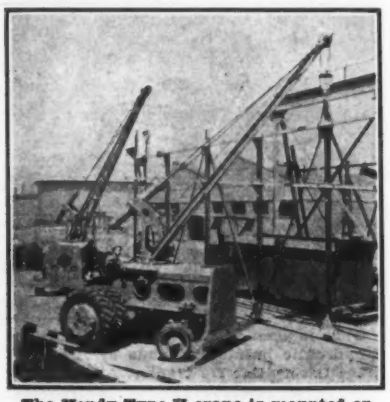
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 14.

Data on Gasoline Engines

A folder describing two models of its 4-cycle air-cooled engines is being distributed by the Gladden Products Corp., 635 W. Colorado Blvd., Glendale 4, Calif. The Model AB Bee-Line engines are rated at 3 hp at 1,800 rpm; 5 hp at 2,600 rpm; and 6 hp at 3,200 rpm. The Model BB is rated at 2.5 hp at 1,800 rpm; 3 hp at 2,000 rpm; and 4.3 hp at 3,000 rpm.

The small folder tells that these engines were designed to give high performance and economical operation over a long period of time. It also enumerates their operational features, and gives complete specifications and dimensions for both models. Also available from Gladden are installation prints, and prints showing the power curves.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 79.



The Hendy Type U crane is mounted on a Model UTI Minneapolis-Moline tractor and is hydraulically controlled. The manufacturer recommends it for handling heavy concrete-culvert sections, pipe, construction beams, etc.

New Tractor Crane Lifts 4-Ton Loads

A portable tractor-mounted crane for lifting loads up to 4 tons is made by the Joshua Hendy Corp., Torrance, Calif. Hydraulically controlled, the Hendy Type U crane is mounted on a Model UTI Minneapolis-Moline tractor. It is recommended by the manufacturer for use in handling heavy concrete-culvert sections, construction beams, mechanical equipment, pipe, concrete reinforcing, and other loading and unloading requirements.

The welded-steel boom is raised and lowered by a hydraulic cylinder mounted on the gantry and controlled by a valve at the right of the steering wheel. The full-revolving turntable rides on large-diameter steel balls. The frame is said to transmit all loads to the front and rear axles, eliminating strain on the tractor transmission housing or engine case. Easy steering is said to be obtained through the use of a steering gear with roller-bearing knuckles.

The tractor is provided with a rear power take-off and a pintle-hook drawbar at the rear. It has a 72-inch front axle, heavy steering spindles and reach rod, and heavy cast wheels. The wheels have solid cushion tires, 28 x 10 inches in size. The stabilizers are said to permit full front-axle movement.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 11.

Diesel-Maintenance Truck

The first of a fleet of diesel-maintenance shops on wheels has been put into service by the Detroit Diesel Engine Division of the General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich. The unit has been designed for a two-fold purpose: to answer emergency service calls by dispatching a trained mechanic equipped to diagnose and perform the required repairs on the spot; and to make scheduled service inspection calls at periodic intervals on all users of General Motors Series 71 diesel engines, as part of a preventive-maintenance program.

The truck used is a Chevrolet ½-ton panel model. It has been equipped to handle all kinds of engine servicing work, with the exception of a major overhaul. It contains a complete set of tools and trouble-shooting instruments, a gasoline-driven ac generator, floodlights and extension cords, and a supply of 300 replacement parts.

Johns Heads Thor Division

B. H. Johns has been appointed Manager of the Mining & Contractors Tool Sales Division of the Independent Pneumatic Tool Co. W. B. Smith, former Manager of the Houston branch, will succeed Mr. Johns as Manager of the St. Louis branch, and R. F. Caslin, former Thor electric-tool service engineer in the Houston territory, has been appointed to succeed Mr. Smith.

Mixer Is Accessible For Easy Discharging

A concrete mixer featuring increased accessibility has been put into production by the Jaeger Machine Co., 701 Dublin Ave., Columbus, Ohio. It is a 3½-S end-discharge tilting-type model and is recommended by the manufacturer for mixing concrete, plaster, and bituminous materials. A new design permits it to be towed in the mixing position.

The mixer has two support legs in the rear, which hold it when the towing bar is removed. Due to the removability of this towing bar, there is no obstruction in the front of the mixer during work operations. Wheelers can approach from either side, take the load in the center of the barrow, and leave without reversing direction.

A V-bottom-drum design, patented by Jaeger, is employed in this unit. It combines with two double mixing blades to produce crisscross movement of the material. The drum turns in two Timken tapered-roller bearings. Drum bowl, yoke, and ring-gear are of heavy semi-steel; the drum cone is rolled steel; the drum opening has a solid-steel half-round reinforcing.

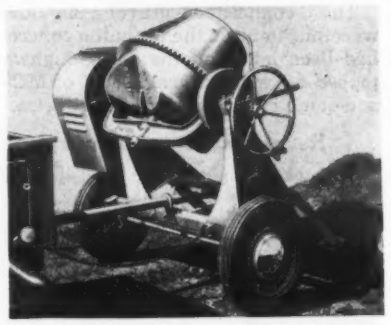
Power for the mixer is furnished by a 2½-hp air-cooled Wisconsin engine. The engine, reduction gear, and chain drive are fully enclosed for protection. The entire side of the housing opens for easy access. A toolbox is enclosed in the engine housing. A lever and pawl assembly is said to lock the drum in any position.

Coil-spring suspension, wide-tracking automotive-type wheels with Timken bearings, and low center of gravity are other features claimed for the unit. It is returned to position for transporting by pushing the tow pole down to hitching level. This tow pole also acts as a safety stop to prevent the mixer from tipping forward.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 48.

Curve-Drawing Aid

A new device for drawing curves has been put on the market by the Cook Specialty Co., Green Lane, Pa. Known as the Infinarc, it consists of four preformed wire curves and a 12-inch base. According to the manufacturer, with this unit it is possible to produce almost any shape desired, including reverse curves.



A removable tow pole enables wheelers to approach this Jaeger 3½-S tilting-type concrete mixer from either side, take the load in the center of the barrow, and leave without reversing direction. It is towed in mixing position. The support legs are at the rear.

The various shapes are obtained by moving either or both of two adjusting screws along slots located in the base. The wires attach to the adjusting screws by means of snap loops. Made entirely of stainless steel, the unit comes equipped with a lacquered wood instrument case.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 22.

New Lima Appointments

Fred L. Maus has been named District Manager at Memphis, Tenn., by the Lima, Ohio, Shovel & Crane Division of the Lima-Hamilton Corp. He will cover the states of Tennessee, North and South Carolina, Georgia, Florida, Alabama, Louisiana, and Arkansas. He will be succeeded as District Manager in the Dallas office by R. A. "Bob" Otterness, whose territory covers Texas, New Mexico, Colorado, and Oklahoma.

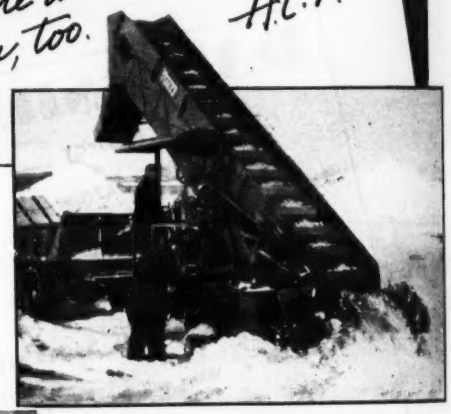
Wilhelm-Davies Co., Inc., has been appointed sales agent in the state of Connecticut for the complete line of Lima shovels, cranes, and draglines. The company's offices are located at No Colony Road, Wallingford, Conn.

MEMO

Re: SNOW REMOVAL

Looks like Haiss High Capacity Loading is the answer to our snow problem, too.

H.C.P.

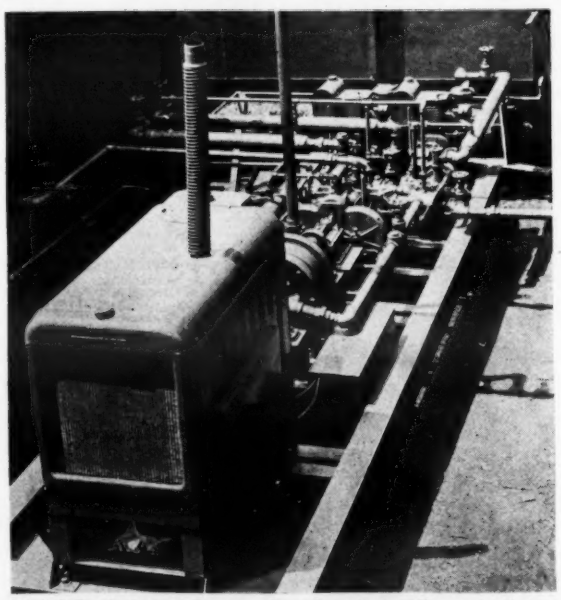


The Haiss Model 75W Snow Loader digs . . . breaks-up and loads wet, dry or frozen snow at better than 10 yds. a minute. Haiss Troughing Conveyors (below) are also available for low-cost aggregate handling, pouring concrete, etc. Catalogs on request. Geo. Haiss Mfg. Co., Inc., 140th St. & Rider Ave., New York 51, N. Y.

HAISS

PORTABLE CONVEYORS • LOADERS • CLAMSHELL BUCKETS

IF YOU USE LIQUID ASPHALT



Model B-14, Diesel Power, Capacity 3000 gallons per hour.

YOU SHOULD CONSIDER MANUFACTURING EMULSIFIED ASPHALT

- SAVE FREIGHT
- SAVE FUEL
- SAVE MONEY

PORTABLE AND PERMANENT FACTORIES ARE NOW OFFERED IN SIZES WITH CAPACITIES OF 1000 TO 6000 GALLONS PER HOUR

PROCESSES AND TECHNICAL SERVICE WITH ALL UNITS

K. E. McCONNAUGHAY EMULSIFIED ASPHALT PLANTS 100 PRECISIONS LAFAYETTE, INDIANA

"How Joe, Bill, and Red deliver the aggregate; Williams on the paver; Oscar, John, Tom, and Mike in the backfield."

What Does Safety Mean to Your Job?

Tangible Benefits Result From Careful Planning To Eliminate Accidents As Operating Expense

+ SOME 1,300 years ago, in the year 643 A. D., the construction industry as it then existed received its first recorded order making it mandatory for employers to compensate directly men employed as masons, when they sustained injuries resulting from occupational accidents. Under this order, the full cost of accidents became a direct operating expense.

Social progress through the centuries has brought many variations and adjustments in the distribution of this expense. But the fact remains that the cost of accidents in construction today is an item of serious concern and represents a real problem for the industry.

Plan for Safety

In spite of the tremendous advances in technical skill and job methods, contractors generally have not applied their ability and skill to the challenge presented by consistently high accident-frequency and severity rates. For many years the construction business as a unit has never placed better than twenty-sixth in a list of thirty key industries for which national accident rates are annually compiled. Yet reduced operating costs, through lower insurance rates, can be attained only by the prevention and elimination of accidents.

To accomplish results in safety, we must first believe sincerely in safety and do things in a planned safe manner. From the acceptance of a bid to the release of the completed project to the owners, both the general contractor and his subcontractors should consider safety in every operation. No contractor is immune to the possibility of accidents. And no job operation is too small or too large for the successful application of sound accident-prevention and safety measures.

All job planning should have due regard for safety. Superintendents and foremen should be instructed in the required safety measures to be applied to the entire project, and to individual operations, for the maximum protection to employees and the general public.

Accidents Are Operating Expense

Construction is highly competitive. And it will become more so as general conditions improve to a point where the tremendous volume of impounded projects can be released. Under stiff competition, contracts can be won or lost by very narrow margins. To be successful, a contractor must perform a certain volume of work each year, not only to justify his investment in time and equipment, but to return him a reasonable profit for his effort.

Any procedure which will lower operating costs is a definite advantage and is worthy of consideration. Any expense which can be eliminated or reduced by efficient organization, management, or field control may represent the difference between winning or losing a contract. The cost of accidents in the construction business is a variable but controllable operating expense. The contractor's success or failure in preventing accidents determines the amount of this expense.

The modern method of assuming the cost of accidents is through insurance. This is normally considered an overhead charge, but actually, because of the wide opportunity to control this cost through effective accident-prevention measures, it is an *operating* expense. Compensation and liability-insurance costs are not strictly in the same category as taxes, permits, performance bonds, and other related items, because the costs of these are relatively fixed, are not subject to control, and are therefore true overhead expenses.

Insurance in itself does not prevent accidents; it merely assumes the risk, and transfers the responsibility for payment of the loss to the carrier. The insured nevertheless pays part of the bill in the form of rates chargeable and assessed against the particular operations in which he is actively engaged. Depending on his individual effort to prevent and eliminate accidents, every contractor can practically make his own rate; he can thereby directly control this cost within certain limits above or below the basic rates prevailing for his type of operation.

(*Concluded on next page*)

MARVEL CONCRETE VIBRATORS

also
Asphalt and Tar Kettles
Portable Hoists
Generator Sets
Utility Saw Rigs
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WRITE FOR DETAILS

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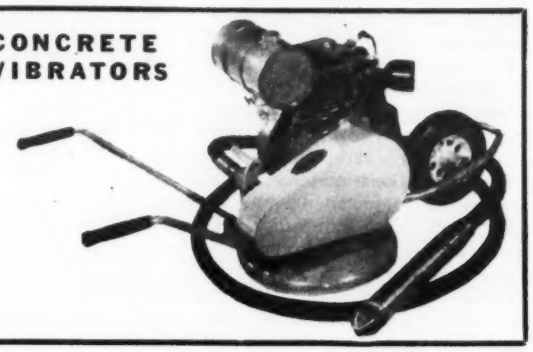


KIM Hotstart

REG. U. S. PAT. OFF.

Motor Pre-Heater

WHAT KIM DOES A KIM Hotstart installation on your engine reduces motor wear and depreciation. Starting is quick, easy—regardless of severe weather. Battery life is lengthened. Cost of terminal heating can be cut substantially. No need to keep motors idling in layovers. Operation schedules lose less time.

HOW KIM DOES IT By controlled percolator-flow action KIM Hotstart draws cold water from engine into head of the Hotstart where it is heated, then forces water back into engine at another point. It does not interfere with the regular circulation of anti-freeze liquids.

FOUR MODELS KIM Hotstart is made in 4 models for use wherever there are engines and electrical outlets for a hookup. If you operate buses, tractors, passenger cars — mobile or stationary engines of any kind, Diesel or Gas—you can use a KIM Hotstart profitably. Write for literature. KIM Hotstart Mfg. Co., West 917 Broadway, Spokane 11, Wash.

Quick starting for Gas and Diesel engines of all kinds. Use coupon for literature, prices, name of nearest dealer.

KIM Hotstart Mfg. Co.
West 917 Broadway, Spokane 11, Wn.

Please send literature, prices and name of local dealer.

Name_____

Company_____

_____
Street City Zone State

Safety on Your Job

(*Continued from preceding page*)

Safety Is Possible

Control and prevention of accidents in the construction industry is possible. Some contractors are continually demonstrating this. And if it can be done by some, it can be done by all who are willing to devote the necessary effort and action.

It should present no great problem to the average contractor. Daily he solves more difficult problems. The very nature of his work trains and schools him in overcoming obstacles far greater than those underlying the principal causes of accidents on construction work. Nor is safety an extra chore; no red tape is involved. There is organization enough on all contract operations to handle it effectively. Moreover, its advantages are many, because its results are the same as those of any efficient production activity.

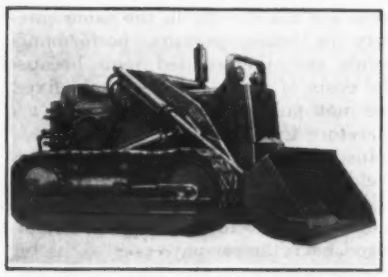
If the same degree of planning and analysis that go into the preparation and performance of a contract were applied to the problem of accident prevention, the position of the construction industry in the national safety ratings would be consistent with its contribution to the general welfare and development of the country. And the cost of insurance to the industry would be considerably lower.

The Benefits Are Many

What, then, will active interest and consistent devotion to safety do for the construction industry? Specifically it has been proved that lower accident rates will reduce costs, provide better working conditions, and attract and hold a higher grade of labor. A safe job eliminates certain types of labor difficulties, and it is definitely good public relations.

Aside from these practical considerations, it offers far greater advantages. Certainly no science or branch of engineering can accomplish a more important task than the protection of life and limb—which is, after all, the ultimate objective of all safety effort. Peace of mind, preservation of human skills, elimination of waste, and increased personal efficiency are goals worth attaining. They can be reached by sincere effort in the prevention and elimination of accidents in construction.

From an article by F. G. Smethurst, Engineer, American Mutual Liability Insurance Co., in a recent issue of "American Mutual Magazine".



This new Hough Bulldozer-Shovel for use with International TD-14 track-type tractors has a 2-yard capacity. An automatic device can tilt the bucket back 38 degrees when in carrying position to prevent spillage.

New Shovel Unit Fits Heavy-Duty Tractors

A hydraulically controlled two-yard Bulldozer-Shovel for use with the International TD-14 track-type tractor has just been announced by The Frank G. Hough Co., Libertyville, Ill.

The front-mounted hydraulic pump is directly connected to the engine's crankshaft. A single lever is used to raise, lower, hold, or float the bucket. It is also used to apply down pressure when hard digging is encountered. According to the manufacturer, the bucket can be dumped partially or completely at any height and returned by hydraulic power.

An automatic tip-back is said to tilt the bucket back 38 degrees in the carrying position to prevent spillage. The tracks are not tied down, but oscillate freely to conform to ground contour. Front-end superstructures have been eliminated to provide the operator with complete visibility in every direction. The bucket extends the full track width. A full-track-width bulldozer blade can be quickly attached, according to the manufacturer, and permits a variety of jobs consistent with the size of the tractor.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 47.

Nordberg Promotes Four

Four divisional managers have been promoted to vice presidents by the Nordberg Mfg. Co. of Milwaukee. Roland W. Bayerlein has been named Vice President in charge of the Heavy Machinery Division; H. H. Talboys will head the Railway Equipment Division; D. A. Cheyette will head the Crusher Division; and R. R. Shafter will be in charge of the Process Machinery Division.

Compression Tester For Diesel Engines

A device for testing the compression in diesel engines is made by the Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa. This tester is designed to replace the fuel injector during tests, and is held in place by the same means as is used for holding the fuel injector.

After the tester is attached, the engine is started and operated at either cranking or idling speed. The engine pressure is communicated to a dial gage through a cartridge-sealed trapping device in the adapter. This causes the gage pointer to swing gradually to the maximum compression pressure. When the needle reaches this point, it remains there until released by depressing a push-button vent valve. This feature is said to make possible the taking of several compression readings in quick succession.

Features claimed for this device include: easy readability of the 3½-inch-dial gage; handling convenience due to the flexible extension which facilitates use of the tester irrespective of the location of the injector holes; union connections on both ends of the flexible connection to permit positioning of the gage for readings; a universal adapter which fits 54 types of diesel engines, with special adapters available to fit practically every make of diesel. All adapters are designed to hold a replaceable cartridge, which is a separate, interchangeable sealed capsule containing the pressure-trapping device.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 49.

Newton Named by Lincoln

R. H. Newton has been appointed Manager of Dealer Sales for The Lincoln Electric Co., Cleveland manufacturer of welding supplies and equipment. This office is newly created, and its function will be to franchise and organize welding-equipment dealers.

Not just because it reduces the pull on steering levers to five pounds, or even less, but because it reduces wear on clutches, throwout bearings and brakes. Silver Steering Boosters pay their cost many times over in many ways. Any tractor dealer will install one on trial, ON APPROVAL, in less than thirty minutes. Ask your dealer to demonstrate a Silver Booster and you will never operate a tractor without one.

Silver BOOSTER MANUFACTURING CO.
1406 SOUTH GRAND AVENUE
LOS ANGELES 15, CALIFORNIA Richmond 8191

Keystone
FIBRE EXPANSION
JOINTS

Through the completion of a new fibre joint plant, Keystone is now in a position to accept and ship orders of Fibre Expansion Joint. Keystone Fibre Expansion Joint meets all State specifications and is used in all types of concrete construction, such as, highways, airport run-ways, sidewalks, driveways, or large industrial floor areas. Keystone (non-extruding) Fibre Expansion Joint is light in weight, easy to handle under all weather conditions and never becomes sticky or tacky in summer or hard and brittle in the winter. All Keystone Fibre Expansion Joints have been properly treated and cured for best possible workability and durability. Assure yourself of carload rates by making up a full car from Keystone's complete line of paving products — all shipped from just one source.

ARCHITECTS AND BUILDING CONTRACTORS
Keystone's Engineering and Research departments are always ready to help you with recommendations as to how these products can be used in your construction or building projects. Write for information or contact your local Keystone dealer.

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KEYSTONE ASPHALT PRODUCTS COMPANY
A Division of the American-Marietta Company 43 E. Ohio Street, CHICAGO 11, ILLINOIS

Pit Gravel Assists In Road Maintenance

County Buys Material but Handles It With Own Men; Has Garage and Shop for Equipment Servicing

+ OF the 1,120 miles of roads in Vigo County, Indiana, over 70 per cent, or 800 miles, are of gravel. Consequently one of the major problems of the County Highway Department is to obtain suitable gravel to keep these roads in shape. Fortunately, Vigo County, especially the northern portion, has several gravel pits which provide the material for this purpose. These pits are privately owned, but the County has been able to purchase even the best grades of gravel for 25 cents per yard.

However, this figure is for gravel in the pits. So the County must excavate the material, haul it to the job being improved, and spread it on the road. These operations are carried out with county-owned equipment and county maintenance forces.

Gravel excavation is done with either a Quick-Way 3/5-yard dragline mounted on a White 6-ton truck, or a Northwest ½-yard crawler-type dragline. These two excavators load to a fleet of as many as 16 trucks—12 Internationals and 4 Dodges—which haul the gravel to the road where it is dumped, and then shaped with motor graders. Enough pits are available so that the longest haul within the county is only 10 miles. So far this year the greatest amount of gravel bought and put on the roads in any one month was 4,500 cubic yards during May.

Limited Budget

The County must follow low-maintenance-cost policies on its highway system because of the limited budget on which it operates. This year, for instance, the Highway Department has been allocated $180,000 on which it must maintain its roads and bridges. None of this money comes from the general county tax rate, but represents the county's share of the gas-tax fund after it has been divided among the state, cities, and counties.

The proportion received by each county is based on the number of motor vehicles registered in that county. This year Vigo County registrations have decreased. So the Highway Department must get along on a smaller proportion of the 3-cents-a-gallon gasoline tax which is distributed throughout the state, and of which the Federal government takes a tax of 1 cent on the gallon. Of the $180,000, about $20,000 goes for insurance of various kinds, which puts something of a dent in the working capital.

From this fund the County maintains a highway system which serves an area of 417 square miles of land (the county has 10 square miles of water), and a population of close to 100,000. The majority of its inhabitants live in Terre Haute, the county seat, which has a population of 83,870.

Vigo County lies in the western part of Indiana along the Illinois border and is drained by the Wabash River flowing through it from north to south. Beyond the city limits of the county seat the rolling topography of the countryside is given over chiefly to agriculture. But here and there a bituminous-coal mine, of either the deep or strip variety, impinges on the green landscape. Heavy traffic passes through the county on two important Federal routes, U. S. 41 going from north to south and U. S. 40 from east to west.

About half a century ago brickmaking was an important local industry and much of the early highway construction in this area was done with red brick. The County still maintains its own red-brick road mileage by replacement with the same materials when the bricks crack up or are thrown out of the pavement.

Organization and Road Types

The County Highway Department is governed by a Board of three Commissioners, each of whom is elected to a 3-year term of office with a new commissioner elected every year. The present Commissioners are: Howard Leach, President; Ralph Smith and Otis Garmong, members. They in turn appoint the County Superintendent of Highways to a 1-year term. The present Superintendent is Otto Aue, and the

(*Continued on next page*)

TUTHILL GUARD RAILS

Up-to-date highways need modern guard rail protection. Here's why it will pay you to install the TUTHILL Guard Rail:

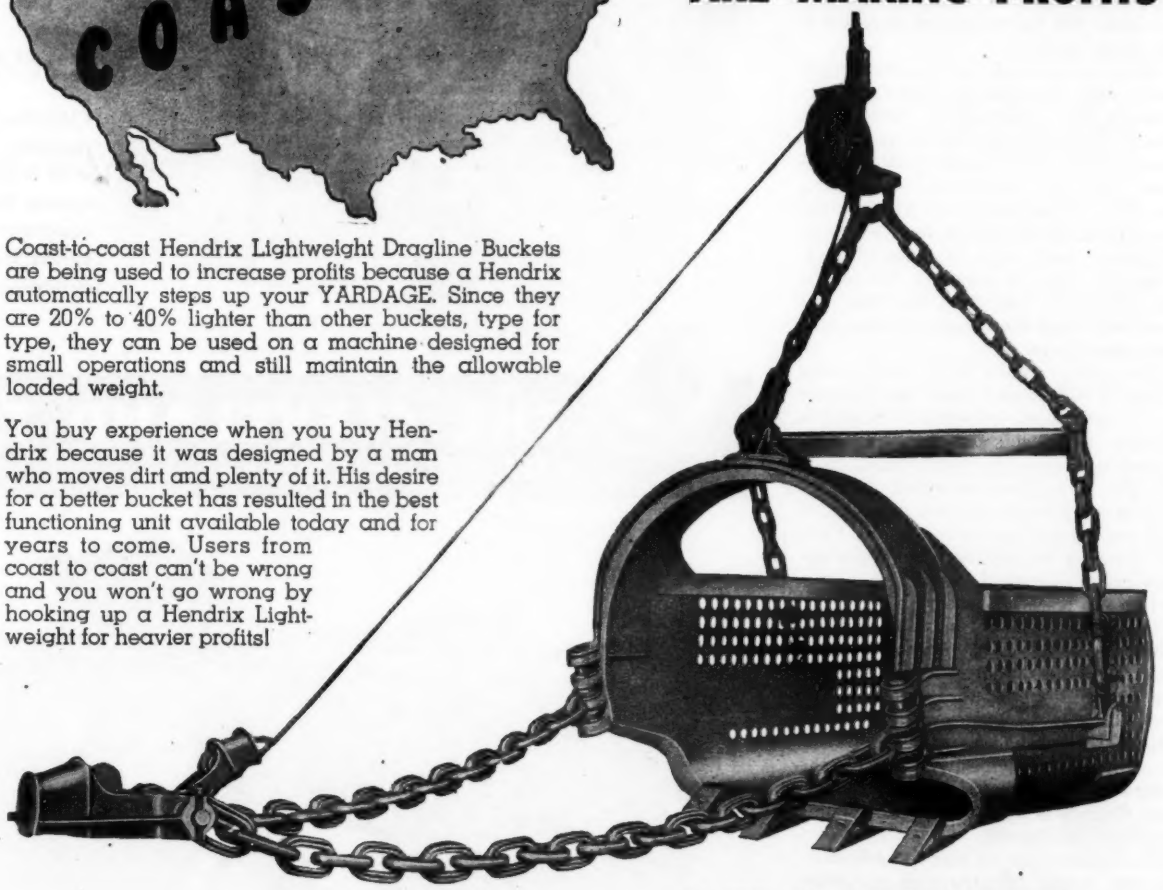
Saves lives. The springy, convex rail keeps cars from going off the road. At night, too, it shows up clearly under headlights, plainly marking the course of the road.

Saves dollars. The one-piece, weatherproof Tuthill Guard Rail is simplicity itself. Easy and quick to erect. Never can sag. Requires little or no maintenance.

Be wise. Select the Tuthill Guard Rail for your highway installations.

TUTHILL SPRING CO.
762 W. POLK STREET, CHICAGO 7, ILLINOIS

HENDRIX BUCKETS ARE MAKING PROFITS



Coast-to-coast Hendrix Lightweight Dragline Buckets are being used to increase profits because a Hendrix automatically steps up your YARDAGE. Since they are 20% to 40% lighter than other buckets, type for type, they can be used on a machine designed for small operations and still maintain the allowable loaded weight.

You buy experience when you buy Hendrix because it was designed by a man who moves dirt and plenty of it. His desire for a better bucket has resulted in the best functioning unit available today and for years to come. Users from coast to coast can't be wrong and you won't go wrong by hooking up a Hendrix Lightweight for heavier profits!

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durability.
- ★ Manganese Steel Chains fittings and reversible tooth points.
- ★ Full Pay load every trip, even in wet digging.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
- ★ Three types: light, medium, and heavy duty. With or without perforations.

⅜ TO 40 CUBIC YARDS

HENDRIX Lightweight DRAGLINE BUCKETS

Write for descriptive literature or ask your dealer

HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA

Pit Gravel Assists In Road Maintenance

(*Continued from preceding page*)

Chief Clerk is Katherine Radtke.

The county is subdivided into 12 townships, with a county assistant supervisor in charge of the road maintenance work in each area. In the summer the total number of employees averages around 100, and of these about 60 are kept on the whole year through.

Of the 1,120 miles of county roads the gravel type leads with 800 miles. The breakdown into type is as follows:

Gravel	800 miles
Concrete	100
Bituminous	65
Brick	29
Dirt	126
Total	1,120 miles

Most of the mileage in the bituminous classification consists of a bottom course of stone and bitumen mixed in place on the road, and topped with a surface course of bitumen-coated stone. The latter is mixed at a plant, hauled to the job, and spread in place by graders. For the brick pavement a concrete base was laid first. This was covered with a layer of sand into which the bricks were set, and then the surface was flushed with mortar.

No new roads have been constructed by the County since before the war. When a new road is built in connection with a real-estate development and turned over to the County, it is maintained by the County with the same type of surface with which it was constructed. No improvement is made to the road, however.

Bituminous roads are patched regularly with pre-coated material purchased from commercial bituminous plants. No surfacing has been done in recent years on any of the County highways. In many instances property owners have organized into groups and have, themselves, paid to have a stretch of gravel road oiled in front of their property. This is done by one of the oil companies, but once the road has been improved the County maintains it in its new form.

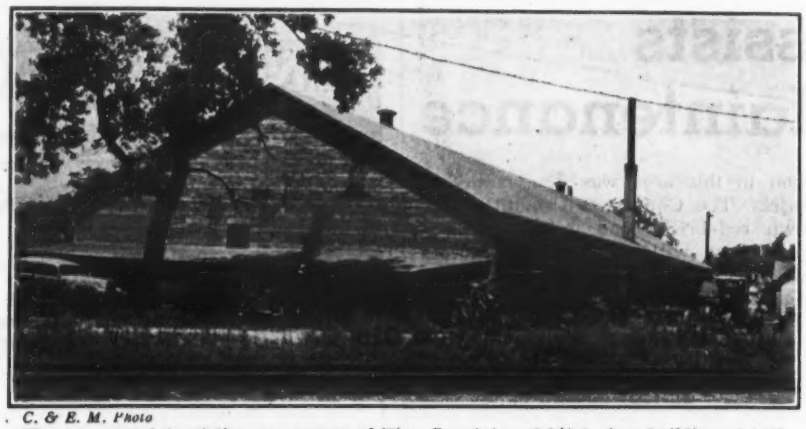
The gravel roads have an average width of 16 feet and their maintenance is a continual all-year operation. Usually the roads in three or four townships are supplied with gravel from one pit. The truck-mounted dragline used in working the pit is a mobile unit and can easily be shifted about from one location to another. The crawler-type crane is moved around on a low-bed trailer towed by a truck.

These excavators and the various other pieces of equipment are fueled from small 300-gallon skid tanks which are scattered about the county at the homes of the various assistant supervisors. These tanks are supplied by the oil companies which currently have the contract to furnish fuel and lubricants. Vigo County is now using DX gasoline and Shell lubricants.

The County has no way of undertaking any major construction operation should the necessity arise. If a bridge, for instance, should be washed out in a flash flood a bond issue would have to be floated to obtain funds for the work. Just recently such a problem was averted, when a bridge abutment was undermined in a flood so that the concrete wall was resting only on a few piles. County forces went to work, first pumping out the water from the newly created hole beneath the bridge. Next a carload of sand was dumped into the big opening until it was completely filled up again. This was followed by the construction of a new concrete footing for the abutment, and the cost of a new bridge was saved.

Maintenance of Equipment

County highway equipment is maintained in a red-brick shop-garage on the corner of 13th Street and 7th Avenue in Terre Haute. Built as a boiler factory about 35 years ago, the building was acquired by the County 10 years ago. It is a big rambling structure 165 feet long x 65 feet wide, with a concrete floor and steel trusses supporting a peaked roof of asphalt composition.



C. & E. M. Photo

The camera points at the rear corner of Vigo County's red-brick shop building at 13th Street and 7th Avenue in Terre Haute, Ind. It was built as a boiler factory.

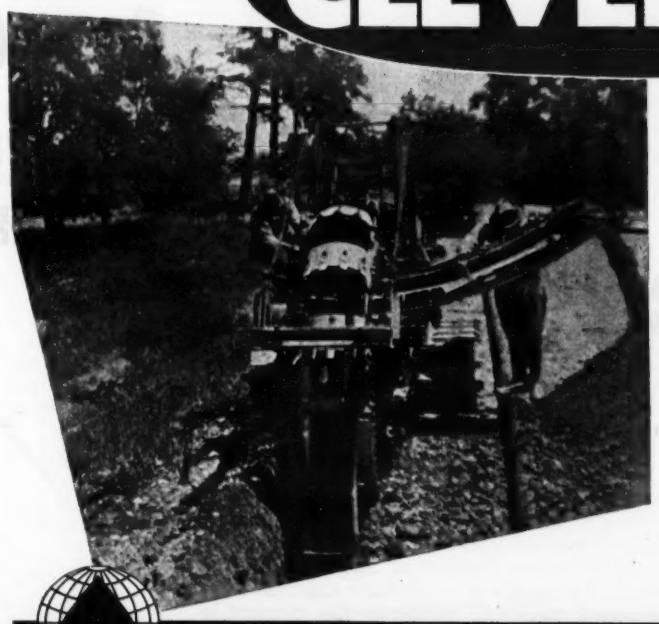
On each side down the length of the shop an I-beam is supported by the roof trusses. These in turn support a transverse beam from which is suspended a Wright 3-ton hoist that can be moved to any point over the entire floor area. On each side of the shop a 12 x 12-foot sliding door admits the equipment. Windows along the sides, and overhead lights, furnish illumination. The building is heated by a coal-burning boiler.

A railroad siding enters the yard from the tracks of the New York Central and the Chicago & Eastern Illinois railroads, which pass close by. At the rear of the shop a 10-foot-wide wooden lean-to runs the width of the building and is used chiefly for the storage of reinforcing steel. A cinder driveway surrounds the building, which has storage areas in the yards on the east and west sides.

In the northeast corner of the building is a small office for the shop foreman, and in the southeast corner is another partitioned-off enclosure for parts and supplies. A toilet adjoins the

(*Concluded on next page*)

CLEVELANDS



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office, and just outside in the yard is a gas pump where the equipment is fueled. At the north or front end of the shop along the side walls are 3 x 12-foot wooden work benches for the mechanics, and wooden cabinets for tools and parts.

Shop equipment includes a Westinghouse stationary air compressor; an Allen battery charger that can accommodate 6 batteries at a time; two heavy-duty 12-inch grinders for sharpening mower blades; a 6-inch bench grinder; and a Stanley drill. Equipment is lifted either on the overhead hoist or on any of the four floor jacks. Greasing is done on the Service Station greasing outfit. Heavy repairs are done with an oxyacetylene welding set. A 4-foot circular forge and a 300-pound anvil are also provided.

Besides the previously mentioned cranes and trucks, other equipment that is maintained and serviced at the shop includes:

1 Jaeger 1-bag concrete mixer
1 Caterpillar D6 tractor
5 motor graders—3 Galion and 2 Adams
10 road maintainers—5 Burch and 5 Adams
7 Case rubber-tired tractors with mower blades
3 International pull drags
1 Littleford Trail-O-Roller for rolling patches
2 tar pots
2 snow plows—straight-blade type
1 Sullivan 105-cfm air compressor
1 Sullivan pavement breaker

The road maintainers are usually scattered around the County in the custody of the assistant supervisors. Five men is the normal complement of the shop: two mechanics, a blacksmith who also does the welding, a grease monkey for lubricating and fueling the equipment, and Foreman Erwin Leach.

PCA Has Training Course

A training course in the fundamentals of concrete making and concrete construction is now under way. It was established by the Portland Cement Association of Chicago and is open to technical personnel of both the Association and its member companies.

Its objective is to provide an intensive training in modern construction practices to enable new men on its staff to serve the public more effectively. The course will take 13 weeks.

John A. Ruhling has been appointed Manager of Technical Personnel Training, and in this position he will be responsible for the course. Carl A. Menzel, Research Engineer with the Association since 1928, has been appointed to succeed Ruhling as Manager of the Housing and Cement Products Bureau.

New Portable Crusher Fits Flat-Bed Truck

Production of a self-contained portable crushing unit has been announced by Nordberg Mfg. Co., Chicago and Oklahoma Aves., Milwaukee 7, Wis. It can be furnished with electric motor or diesel or gasoline-engine drives.

Recommended by the manufacturer for use by contractors, it adapts to semi or fully portable operations, or for stationary plant operations as a secondary reduction unit. For transporting, it can be mounted onto a flat-bed truck or trailer, without disassembling the drive and piping; or draining oil from the pressure lubrication system. It is stated that this unit does not require a heavy foundation while in operation.

It consists essentially of a 22-inch Symons cone crusher, motor and drive, and a supporting base. The discharged product can be drawn off on a belt conveyor or bucket elevator from any one of three sides of the unit. According to the manufacturer, capacity of the unit

The new Nordberg portable crushing unit can be fitted onto a chassis for wheeled transport, or mounted in the field on shallow piers or timbers. It consists of a 22-inch Symons cone crusher, motor and drive, and base; it can be furnished with electric motor or diesel or gasoline-engine drives.

varies from 20 tons per hour at a ⅜-inch setting to 60 tons per hour at a 1½-inch setting.

The electric-driven model is furnished with a 60-cycle motor, rated at 25 hp at 1,200 rpm. It is equipped with a starter, V-rope drive, and a safety guard. The lubricating system is equipped with a safety Mercoid switch. The oil pump is driven through a V-belt drive from the crusher countershaft.

On the diesel and gasoline-engine units, the steel supporting base is fitted with a built-in 85-gallon fuel-oil compartment and a 60-gallon lubricating compartment. The diesel engine has an oversize rating of 50 to 55 hp at 1,500 rpm, governed speed. The engine is equipped with a fuel-oil cut-off valve and an electric starter.

Shipping weight of the electrically driven unit is 10,500 pounds and of the engine-driven unit, 12,400 pounds. The overall dimensions are 122½ inches long, 71½ inches wide, including the V-belt drive and housing, and 86½ inches in height.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 19.

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CONVEYOR, ELEVATOR and TRANSMISSION BELTING
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UNIT 357 — 5 ton Self-Propelled Mobile Crane on sign erection job. Operated by one man . . . powered by one engine.

UNIT 1020 — ¾ yard Dragline used on large drainage project. Full revolving. Finger-tip controls from FULL VISION cab.

UNIT 1020 — ¾ yard Crawler-type Shovel taking a deep bite on a basement digging job. Assures maximum yardage profits.

UNIT 357 — ½ yard Mobile Trenchoe. Modern, self-propelled excavator. Rides on rubber. Operated by one man. Fully convertible.

When you "go into a huddle" to select that next crane or shovel, be sure to consider UNIT. You'll find that every UNIT has the power and stamina to "carry the ball" through to victory. Excavators that move fast . . . bite deep and hard. Cranes with plenty of LIFT ability. Exclusive features include Automatic traction brakes . . . Straight line engine mounting . . . One piece cast gear case . . . Disc type clutches . . . and above all, UNIT'S safety-promoting FULL VISION CAB. Rugged . . . well-balanced . . . always dependable in the pinches . . . UNIT will help you reach your profit goal. Available in ½ and ¾ yard excavators . . . 5 and 10 ton cranes . . . Fully convertible to ALL attachments. Write for literature.

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½ and ¾ YD. EXCAVATORS
5 and 10 TON CRANES
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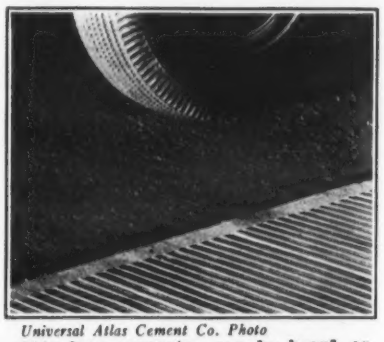
MILWAUKEE 14, WISCONSIN, U. S. A.

"Singing" Lane Marker Aids Highway Safety

If you're humming along a New Jersey highway and the road hums right back at you, you'd better pull over, brother, because you're not traveling in the lane built for you. The "singing" lane separator is the latest development in New Jersey's campaign for highway safety. It is installed on the newly completed section of Route 6.

The lane markers designed by the New Jersey State Highway Department, are concrete strips which give an audible warning or hum when a car tire runs over them. This is caused by the suction of tires when they run over a scored surface. The marker is built by leaving a 2-foot-wide space between lanes for the full depth of the slab. Regular gray concrete is placed in this space, except for the top inch which is white concrete. The corrugations are then made with a hand scoring tool while the concrete is still plastic. Because of the white color and the corrugations, this type of marker provides the driver with a double warning—he can see it as well as hear it.



Universal Atlas Cement Co. Photo

This lane separator can be heard as well as seen. The suction of tires on its scored surface produces an audible hum that warns the driver he's veering out of his lane. The "singing" traffic marker is installed on U. S. 46 or N. J. Route 6, which carries traffic from the west and between New Jersey and New York City.

In addition, the slight elevations and depressions reflect automobile headlight beams to guide the driver in fog or rain. The design was developed under the direction of Harold W. Giffin, Engineer of plans and surveys.

The paving contractor on this project was George M. Brewster & Son, Bogota, N. J., and the marker contractor was the Frapaul Construction Co., Inc., Rochelle Park, N. J. In commenting upon the strip, Spencer Miller, Jr., New Jersey's State Highway Commissioner, says that his engineers are toying with the idea of having the scorings so spaced that they sing, "get over, get over".

Blemish-Free Forms

A new method for forming bevels and decorative grooves on concrete surfaces has been developed by the United States Rubber Co., 1230 Avenue of the Americas, New York 22, N. Y. This new method employs rubber strips attached to the forms, instead of the conventional wood strips. The company states that by using these strips, a smooth finish free of blemishes will result.

The rubber strips will be produced in various shapes and sizes for bevels and for decorative treatment. They are attached to the form with a waterproof adhesive and, according to the manufacturer, they can be easily removed without chipping the mortar. The strips can be used many times.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 33.

IT'S GOT WHAT IT TAKES
to do the job!

The GENERAL Biting into the mucky clay, getting a full dipper load . . . swinging around and up, reaching 'way out . . . dumping the load exactly where it's wanted! In less time than it takes to tell it, the GENERAL power shovel has completed the operation and is swinging back for more.

Over and over again, under the most difficult conditions, finishing the work in a hurry . . . that's the way a GENERAL power shovel is built to operate. The record tells why you can depend on a GENERAL to come through, time and again, with efficient, low-cost operation. That means time, money and manpower saved on your job when you've got a GENERAL. Plan now for the time when you, too, can enjoy the advantages that only a GENERAL can provide. The new GENERALS, tested and proved in service, will be ready soon . . . . . information is available now.

THE RECORD: 98% OF ALL THE GENERALS EVER BUILT ARE STILL IN ACTIVE SERVICE!

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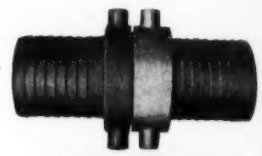
COMBINATION NIPPLE
With Patented "Cor-O-Zig" Corrugations

Malleable iron (cadmium plated) or brass. Made to fit straight end hose. Two-way "Cor-O-Zig" Corrugations permit easier insertion in hose and assure tighter grip under clamp pressure. More practical than regular I.P. nipples. Sizes ½" to 10", inclusive.



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Durable, convenient, economical. Made in three styles—all malleable iron (cadmium plated); malleable iron, brass nut; all brass. Uniform in quality, threading and dimensions. Easily connected and disconnected. Sizes 1¼" to 8", inclusive.

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Made of malleable iron, cadmium plated. Easy to attach, and can be used over and over again. Tightening provides evenly distributed pressure around entire hose circumference, without cutting into hose. Double bolt style has quadruple take-up. Full range of sizes for hose O.D. from ⅞" to 17¼".

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DON'T SKIMP!

Portable Batching Plants For Aggregates and Cement

A catalog describing its line of portable batching plants and equipment for aggregates and cement has been prepared by the Blaw-Knox Division of the Blaw-Knox Co., 2067 Farmers Bank Bldg., Pittsburgh 22, Pa. The catalog includes drawings of suggested arrangements for the various Blaw-Knox bins and batchers.

Bulletin No. 2212 covers the portable aggregate bins in the 2, 3, and 4-compartment styles, ranging in capacity from 100 to 120 tons. The portable cement bins covered are of the 300 and 400-barrel sizes, with arrangements which double these capacities. Weighing batchers to go with the bins for aggregates, cement, and water are also included in the bulletin.

In addition to listing the available sizes and models of this equipment, the catalog gives information on the storage, handling, and weighing of materials. It also illustrates and explains the new twin weighing batchers for one-stop batching of aggregates and cement into two-batch trucks, as well as the Blaw-Knox water-weighing tank with either manual or automatic control.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 66.

Catalog on Clearing Snow

Snow-clearing operations with diesel-powered graders and tractors is the subject of a new catalog available from the Caterpillar Tractor Co., Peoria 8, Ill. The 8-page catalog shows these units at work with V-type and one-way snow plows, snow wings, and tractor-mounted loaders.

The versatility angle is emphasized in that the same equipment is used for regular projects during the milder months. Booklet No. 10367 shows the equipment in use on highways, at airports, and in urban and rural communities.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 95.

Euclid Agent in Canada

The appointment of W. A. Hoffman as sales representative for four Canadian provinces has been announced by The Euclid Road Machinery Co. Mr. Hoffman's territory includes Ontario, Quebec, Manitoba, and Saskatchewan. He plans to make Toronto his headquarters.

WESTERN FOUNDATIONS for Warehouses
Warehouse No. 77
BROOKLYN NAVY YARD
WESTERN installed the foundation Caissons for the 16-story Warehouse No. 77 . . . probably the biggest job of its kind in the world.

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BROOKLYN NAVY YARD'S WAREHOUSE NO. 77 was such a problem. WESTERN'S answer was a completely new type of foundation . . Drilled-In Caissons featuring Sockets of Safety . . . the core bonded deep into bedrock. This job consisted of 180 30" Drilled-In Caissons up to 140' depth to rock . . . 24,000 total lineal footage . . . maximum load per caisson, 1275 tons.

COMPETITIVE ESTIMATES WERE:

Bearing Piles	$1,700,000
20" open-ended steel tubes	2,000,000
Pneumatic Caissons	2,200,000
Drilled-In Caissons	1,250,000

AMONG OTHER WAREHOUSE JOBS BY WESTERN:

PORTSMOUTH, VA. — U. S. Navy
400,982 ft. of 12" Button-Bottom Piles

BOSTON, MASS. — U. S. Navy
130,571 ft. of 12" Button-Bottom Piles

TREASURE ISLAND, CALIF. — U. S. Navy
38,400 ft. of Composite Piles

DO YOU HAVE A FOUNDATION PROBLEM? Tap WESTERN'S FREE CONSULTATION SERVICE for fast action. There's nothing we like better than tackling a tough problem and adding it to our long record of successful jobs. Write for Catalog C.

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New Channel Dredged To Link Two Bayous

Heavy Clearing Done From Pilot Channel Followed by St. Louis Suction Dredge With Spill Barge

✦ WHEN the U. S. Engineers, New Orleans District, completes the enlargement of the East Atchafalaya Basin Protection Levee in southern Louisiana, the gap left in the levee at Bayou Pigeon, 32 miles above Morgan City, will be closed. A new lock is now under construction in that levee at Bayou Sorrel further north. It will permit navigation to pass from one side of the levee to the other along a branch of the Intracoastal Waterway.

But the construction of this great levee running north and south at the east edge of the Atchafalaya River basin has upset the normal drainage pattern of that area. The levee cuts across a series of lakes and bayous, many of which emptied into the Atchafalaya River. With the natural flow impeded by this long earth barrier, some other method of drainage was required to carry off the water to its outlet in the Gulf of Mexico.

To solve this problem, a 9-mile drainage channel has been dredged east of the levee, connecting Bayou Long on the north with Bayou Boeuf on the south. Bayou Long formerly drained into the Atchafalaya basin but is now blocked by the newly enlarged levee and needed a new outlet. Bayou Boeuf begins at the southeast corner of Lake Palourde, which is also crossed by the levee, but flows south away from the levee system. So by linking these two bayous with a new canal, the intricate drainage of this maze of bayous and waterways has been preserved, even though the direction of flow has been changed. In these flat lands of the cypress swamps, the sluggish-moving mysterious bayous do not protest man's tampering with their accustomed movements.

In addition to draining the area, the new channel provides an alternate navigation route for vessels plying between the Plaquemine Lock on the right bank of the Mississippi and the waters of the Gulf. The passage can now be made either through the rivers, connecting bayous, and the new channel, all lying east of the Atchafalaya levees, or by going through the levee and down the Intracoastal Waterway through Morgan City.

The lower 6 miles of the new channel from the head of Bayou Boeuf northwards is virgin cut. It swings in a great arc east and north of Lake Palourde until it meets Bayou Milhomme. For the final 3 miles the line of Bayou Milhomme was followed in an enlarging operation until a junction was reached with Bayou Long. The project lies entirely in St. Martin Parish.

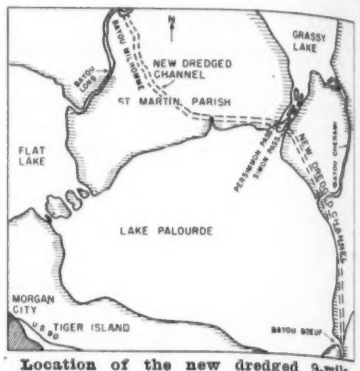
Heavily Timbered Area

The U. S. Engineers awarded a contract for digging this channel to the Hendry Corp., of Rattlesnake, Fla., on its low bid of $362,500 to dredge 2,500,000 cubic yards, the unit price being 14½ cents per yard. Work was started in January and completed in June. The contract called for clearing a 300-foot strip and making a box cut 125 feet wide to —11.0 Mean Low Gulf elevation in order to guarantee a 9 x 100-foot channel. The ground elevation in this area is 2.0, and the soil is sufficiently firm to permit vertical sides in the cut.

For the upper 3 miles Bayou Milhomme was widened, straightened for better alignment, and deepened, if necessary, to the same dimensions as the lower portion of the channel. Most of the dredging here consisted of removing a 60 to 70-foot strip along either bank to the —11.0 M.L.G. elevation, with the dredged material spoiled along either bank. The alteration to Bayou Milhomme also necessitated some road relocation in that area.

At one point the tiny, picturesque Stephensville free ferry that carries traffic on a parish road across the bayou had to be moved 1,500 feet when a sharp bend in the stream was eliminated. The 2-car ferry, a side-paddle-wheeler driven by a Ford Model A engine, is kept on its course by a cable running through the craft and fastened to the opposite banks. When the ferry is in its slip, the cable is dropped to the bottom of the bayou so as not to interfere with navigation, and is raised again by a winch when the boat is ready to make another crossing.

The stiffest work on the entire project was clearing the heavy timber from the lower 6 miles of channel location. A gang of 40 Cajun woodsmen, with three Disston power saws and numerous crosscut saws, first felled the trees —cypress, hickory, gum, and pecan mostly—10 to 30 inches in diameter, and numbering from 350 to 450 trees per acre. Then a flotation or pilot channel,



Location of the new dredged 9-mile drainage channel in the Atchafalaya River basin in Louisiana.

5 feet deep x 40 feet wide, was dug by

(*Continued on next page*)

EARTH moving problems turn into jobs that pay plenty of profits when International Diesels power the work!

More and more contractors are finding this out. They see how International Crawlers lug through heavy going to boil up capacity loads in their scrapers. And when the blades are up they see these outfits hurry to the fill to deliver big hourly yardage.

Then, when they discover how International's unbeatable operating economy keeps costs down, they know that here's *power that pays*. The low maintenance and fuel requirements of International Diesel Crawlers makes successful bidding and profitable results assured.

For facts about the benefits you get in these power-packed tractors, visit your International Industrial Power Distributor. Let him help you select equipment and the *power that pays*.

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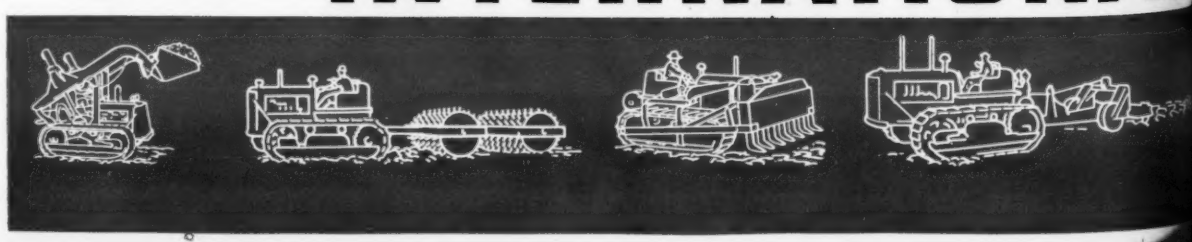
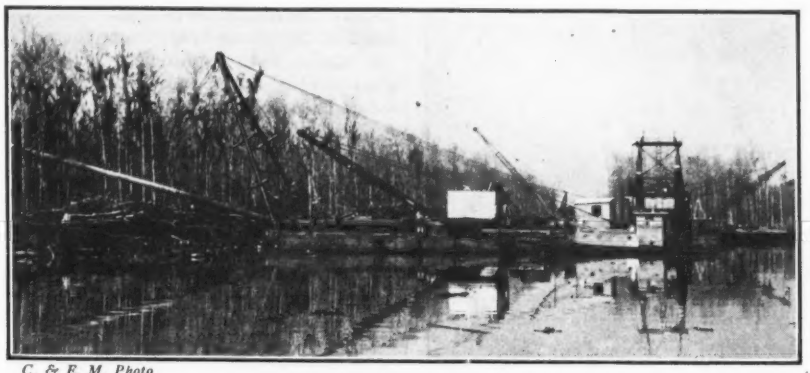


a Northwest crane equipped with an 80-foot boom and an Owen 3-yard clamshell bucket. This rig was mounted on a steel barge, 30 x 110 x 8-foot deep, but with a 3-foot draft. It moved only enough trees to clear the width of the pilot channel, while the excavated material was piled along the west edge of the clearing, forming a dike from 10 to 15 feet high. Later on when the suction dredge moved in, material excavated from the remainder of the channel was pumped behind this retaining dike which prevented the hydraulic fill from running back into the cut. Water from the fill ran off to the west, draining into Lake Palourde.

Another Northwest crane, with an 80-foot boom and an Owen 1½-yard clamshell bucket, also mounted on a 30 x 110 x 8-foot steel barge, was used to pick up brush, piling it along the edge of the clearing. The woodsmen made no attempt to move the large trees as they were cut, as this work was left to the two skid rigs operating along the banks of the pilot channel. The skid rigs consisted of 30 x 110 x 8-foot steel barges each containing an American 2-drum hoist powered by a 125-hp gas engine. From the hoist a Leschen ¾-inch cable ran out to a sheave 20 feet up on a tree about 300 feet in the woods. This cable was an endless arrangement, 600 feet long, with two slings hanging from it which were wrapped around the felled trees. In this way they were easily moved to the bank of the channel, and transported to a lumber mill.



C. & E. M. Photo
In this view looking up the newly dredged channel, we see the spill barge, the crane barge, and the dredge St. Louis.

Suction Dredge St. Louis

As the clearing progressed, the pilot channel was widened and deepened by the St. Louis, or Hendry No. 5, a diesel-powered suction dredge with a 30-inch intake and a 22-inch discharge. Built in 1938, the St. Louis has an all-steel hull of ½-inch plate, 130 x 38 x 9 feet deep, and is painted gray trimmed with red. The bits, capstans, niggerheads, and similar deck gear are painted a brilliant yellow as a safety precaution against the crew's stumbling over them. The 40-man crew, working three shifts, is quartered on the dredge which actually can accommodate 58 if it becomes necessary.

Located on the center line of the dredge aft of amidships is the big prime mover, a Fairbanks-Morse Model 33 8-cylinder 2-cycle diesel engine, 16-inch bore x 20-inch stroke, developing 1,400 hp at 300 rpm on a direct drive to the main pump. Directly in line sternward is another Fairbanks-Morse diesel engine with 6 cylinders, having a 16-inch bore x 20-inch stroke developing 947 hp at 277 rpm. While the dredge pump can operate off the main engine alone, the usual practice is to run it off the combined 2,300 hp of the two diesels. The rear or smaller engine boosts the forward main engine through an alternator, a Fairbanks-Morse synchronous motor with 500 hp at 300 rpm on 480 volts, located directly forward of the main engine.

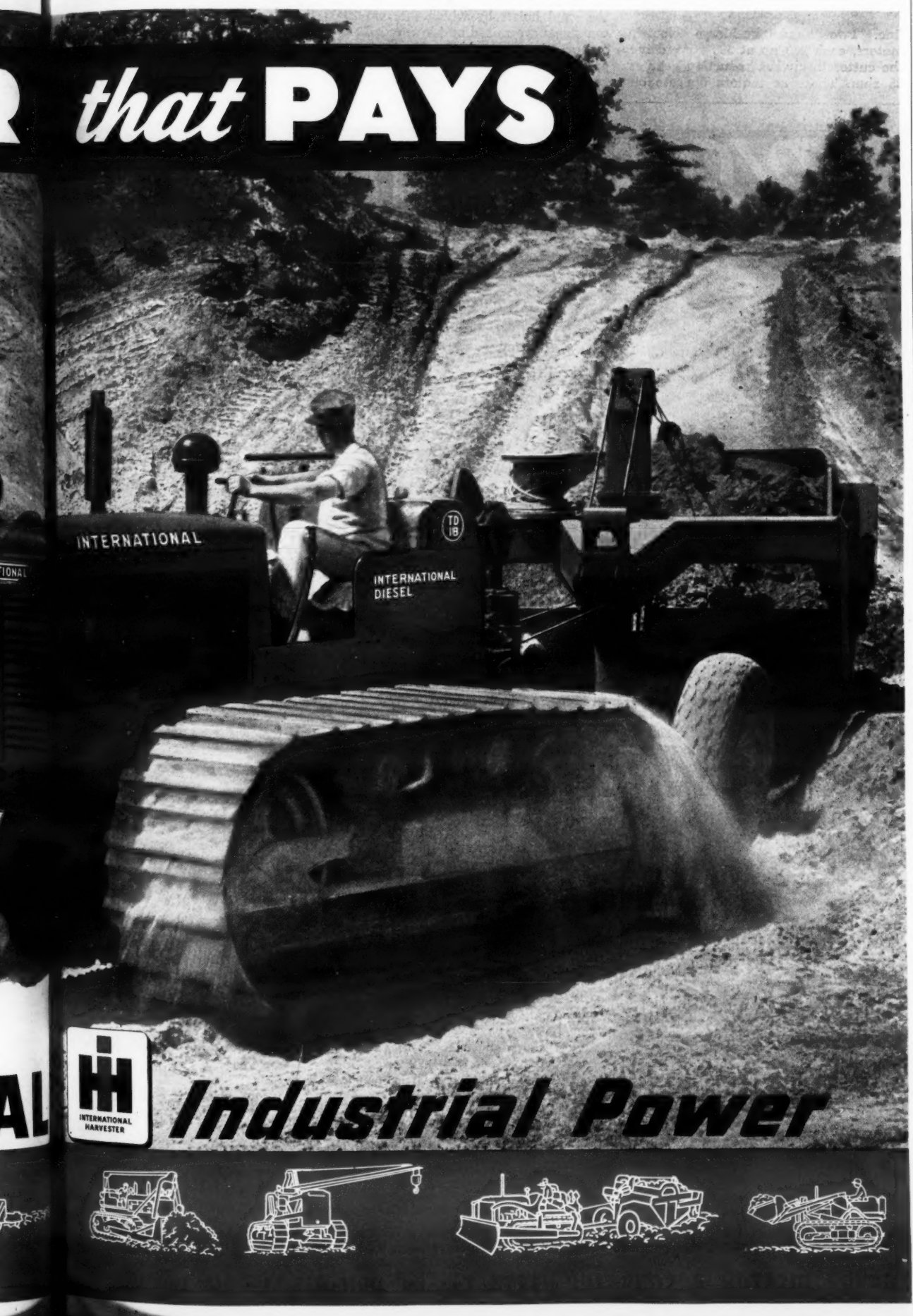
In front of the smaller engine is a Fairbanks-Morse 675-kw diesel generating set which supplies power to run the electric motors driving the cutter head, the swing, spud, and boom lines, and the ladder line. It also furnishes current to the dredge's all-electric system for the stove, hot-water heater, lights, and pump. Opposite this unit, along the port side of the engine-room hold, is a Fairbanks-Morse Model 36A 6-cylinder diesel engine, 90 hp at 900 rpm, which drives a Fairbanks-Morse 94-kva generator. This set is used to supply current for lighting when the other units on the dredge may be shut down, or when the craft is in tow. On the same side of the room opposite the main engine is the master switchboard through which is controlled the ac current at 110, 220, and 480 volts.

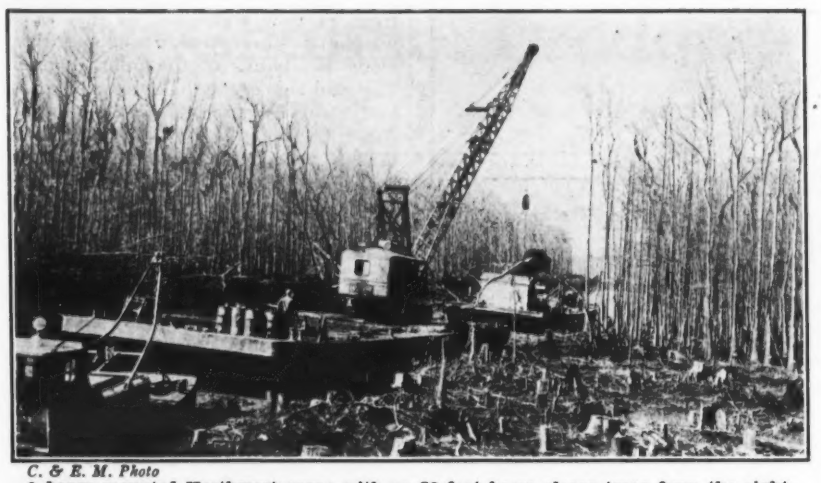
Also along the port side of the engine room is an Ingersoll-Rand air compressor for the main engine, driven by a Fairbanks-Morse 7-hp electric motor at 1,725 rpm. Opposite this unit is an auxiliary compressor, a Gardner-Denver, driven by a Stover 10-hp engine at 1,200 rpm. Sternward of this latter set is located a G-E 400-amp electric welder; near the stern of the dredge is another welder, a Hobart 300-amp unit. Engine-room maintenance and repair equipment includes a LeBlond 24-inch x 10-foot lathe; a Baldor 14-inch drill press; a 12-inch drill press; and two grinders, a 10-inch and a 12-inch model.

Operating Equipment

On the center line of the dredge forward of amidships is the main pump, a Morris type to which some modifications have been added by the Hendry Corp. Equipped with a 78-inch-diam-

(*Continued on next page*)





C. & E. M. Photo
A barge-mounted Northwest crane with an 80-foot boom clears trees from the right-of-way for a new drainage channel in Louisiana.

New Channel Dredged To Link Two Bayous

(Continued from preceding page)

eter impeller having three vanes, the pump has a 30-inch suction and a 22-inch discharge line. Directly behind the pump is a spring or pedestal bearing backed by a Kingsbury thrust bearing which absorbs shocks and vibrations coming from the dredge pump. A 10⅞-inch flexible steel coupling connects the bearing with the alternator or synchronous motor. In front of the pump is a manhole in the suction line which is removed when the pipe line needs cleaning. In the roof of the engine room is a double-track crane carry on which ride two Yale hoists, a 3 and a 10-ton model, used in maintenance operations or for lifting the manhole. Over each engine a suction fan has been installed in the top deck for ventilation. The fans have two blades and are driven by 10-hp electric motors at 900 rpm.

Dredging is done by a spiral-shaped basket-type cutter head, 6 feet long with a 7-foot diameter, having six blades. No special hard surfacing was required on the blades as the digging on this job was all soft material, either clay or mud. The cutter head is at the end of a 58-foot ladder weighing 110 tons, along which the 12-inch shaft is hung, running from the driving motors on deck to the business-like blades forward. Behind the cutter head is a Goodrich 44-inch-long Cutless rubber bearing which holds the cutter head in line. Two Fairbanks-Morse electric motors, each 200 hp at 530 rpm, drive the cutter through a reduction gear at 35 rpm. These ac motors operate on 440-volt 60-cycle current and both are used at the same time; they can drive the cutter with as much as a 30 per cent overload and have not been rewound since their installation.

The ladder is hung from a 35-foot A-frame which in turn is attached to a 16-foot-square box gallows at the bow. Forward in the deck housing is a Bucyrus-Erie 7-drum hoist driven by a G-E 75-hp electric motor. Two of the drums, set a trifle ahead of the others, raise and lower the 2-ton single-fluke anchors through sheaves at the extremities of the 92-foot anchor booms located at the port and starboard corners of the dredge. Of the other five drums set abreast across the hold, the center one raises and lowers the ladder which can dig at a 42-foot depth but was required to go only to an 18-foot maximum on this job. Flanking the ladder hoist are the spud hoists by which the two 20-ton spuds are raised and lowered. They are on 12-foot centers, located in gate wells built outside the hull at the stern, and are 56 feet long, 33 inches outside diameter, and made of two laminated sheets of steel having a total thickness of 1 inch. The port spud is the digging spud, while the dredge "walks" or advances with the starboard spud.

The two outer drums permit the dredge to swing while at work. The St. Louis can swing 230 feet, but in this channel work a 125-foot swing was all that was necessary. The cable size was 1⅛-inch on all the drums. For moving the dredge from job to job, the ladder is picked up and laid on the deck as are the spuds, while the anchor booms are swung back and lashed with cables to the top deck.

From the control house the dredge operator can tell what depth the cutter head is working from the gage board fastened to the A-frame. Within the house are the levers for controlling the various functions and movements of the dredge, with gages to indicate what is taking place. One gage shows the rpm of the main engine; two others indicate amperage on the cutter motors and the

(Continued on next page)

DISSTON CHAIN SAW
with Mercury Gasoline Engine

new LOW PRICES
11 h.p., 2-cylinder engine
Capacities: 24" to 84"

The Disston Chain Saw is the fastest, timber-cutting, portable saw ever made. It is ruggedly built, light in weight, easy to operate, and cuts from all angles. And its numerous exclusive features combine to make it the most dependable, economical and durable chain saw ever made.

Among these features are an 11 h.p., 2-cylinder engine; a positive-acting, non-slip, multiple-disc clutch; a detachable air cleaner which keeps dust from carburetor; die-cast engine cylinders and cooling fan; gear driven magneto; fuel filter built in tank; a tough, cutting chain of Disston Steel which maintains perfect contact with drive sprocket under all load conditions.

The Disston Chain Saw is a product of Disston saw-making skill and dependability. It's a typical example of the economy of Disston quality. Thousands are now in use on operations of many kinds—in the forests; on railroad contracting, and tree service jobs; at shipyards and manufacturing plants—wherever there are heavy timbers to cut.

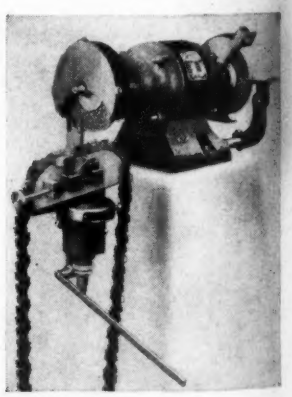
DISSTON CHAIN SAW
PNEUMATIC

HUNDREDS OF APPLICATIONS

A powerful, light weight, air-driven saw that is speeding up timber cutting and reducing costs for general contractors, railroads, shipyards, and many other users. It requires no previous experience to operate, and can be used in all climates and weathers . . . even under water.

Gear housing and saw mechanism may be rotated in either direction for vertical or horizontal cutting. Equipped with heavy-duty, vane-type motor specially engineered and produced by Chicago Pneumatic Tool Company for use on Disston Chain Saws. Requires little maintenance as it is built for long, economical service.

3½ and 5 h.p. motors in 24" and 36" sizes. The 3½ h.p. motor requires 90 cu. ft. of air per minute, the 5 h.p. motor, 150 cu. ft., each at 90 lbs. pressure per sq. in.

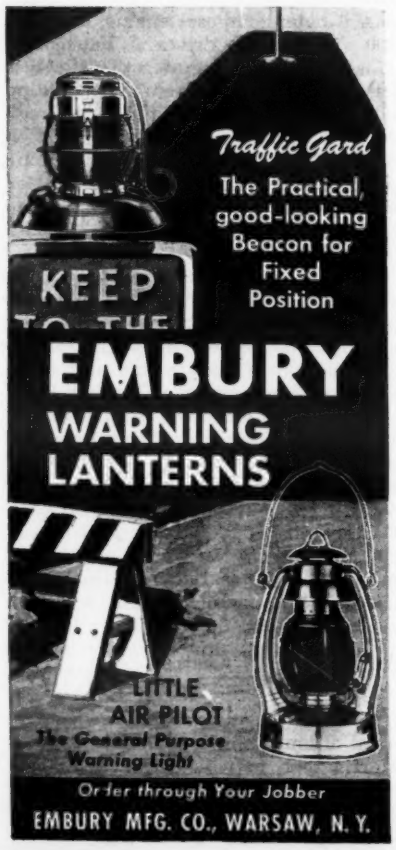


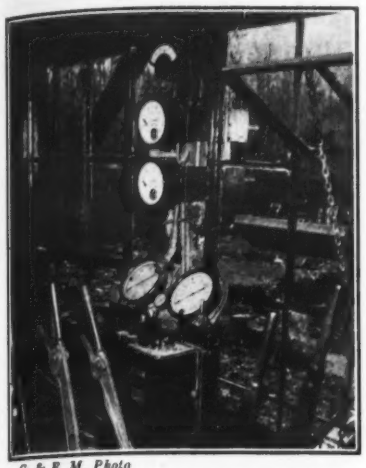
DISSTON ELECTRIC CHAIN SAW SHARPENER

Enables you to do your own sharpening . . . quickly, easily, accurately. Keeps chains in first class condition.

Write for full particulars, or see your Disston Distributor, who carries complete stocks of parts and is prepared to render prompt and expert service.

HENRY DISSTON & SONS, INC., 1174 Tacony, Philadelphia 35, Pa., U.S.A.





C. & E. M. Photo
In the control room of the dredge St. Louis, gages indicate the rpm of the main engine; amperage of the swing and cutter-head motors; suction vacuum; discharge pressure; and the water pressure for the Cutless rubber bearing.

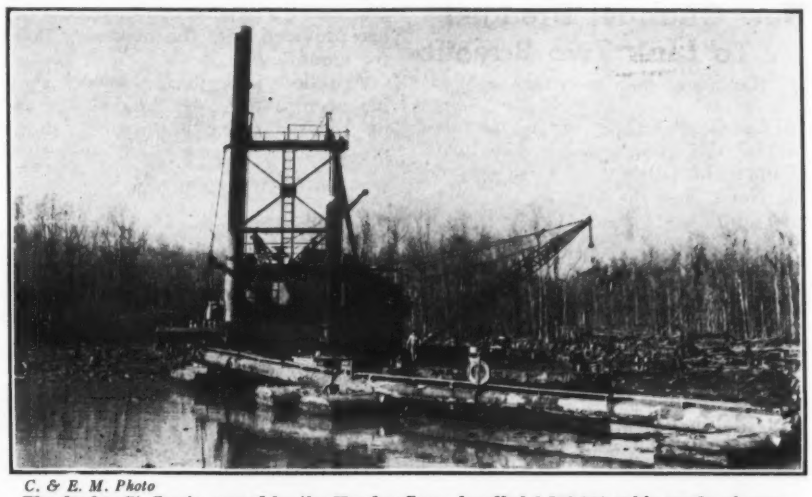
motor operating the 7-drum hoist; the suction vacuum, ranging between 20 and 25 inches, is read from another gage, while the average pressure of 45 pounds on the discharge line is indicated on another gage. The water pressure on the Cutless rubber bearing is also recorded on a gage. A ship-to-shore telephone line is also part of the control equipment.

Discharge Line and Spill Barge

From the pump in the hold the 22-inch discharge line runs directly to the outside deck on the port side, makes a right-angle turn and continues to the stern where it leaves the dredge at the port corner. A connection to the floating line is made with four Mobile Pulley & Machine Works ball joints; one such joint is used to connect the 50-foot lengths of floating pipe. Each section of pipe is floated by two pontoons or cylinders placed crosswise near the ends of the pipe on 38-foot centers. They are 16 feet long on top and 14 feet on the bottom, having a 1-foot rake at each end, and are 40 inches deep and 7 feet wide at the center. The pipe rests in saddles or depressions in the top of the cylinders.

An average of three lengths of pipe or 150 feet of floating line was used from the dredge to a spill barge which was towed along behind. The 6-compartment steel spill barge measures 30 x 100 x 7 feet deep, and at the forward end has a 52-foot A-frame made of 14-inch ID pipe, ⅜ inch thick. The discharge line is carried for 80 feet down the length of the barge, and then continues for a single 110-foot length of ½-inch-thick pipe out from the bow supported by the A-frame. The barge has an American 2-drum hoist powered by a 100-hp gas engine; one drum lifts the pipe by means of a cable running through a sheave at the top of the A-frame, while from the other drum a cable passes to a stump or tree on shore so that the barge can be moved in or out from the bank. The hydraulic discharge from the dredge is thus deposited behind the retaining dike at the side of the channel without the use of a land line. For night work the spill barge is equipped with a Kohler 1½-kw electric plant to provide current for two 500-watt lights rigged to the A-frame. The barge is also used as a work boat and is equipped with a Lincoln 300-amp electric welder.

The St. Louis averaged from 1,000 to 1,500 cubic yards of dredging per hour.



C. & E. M. Photo
The dredge St. Louis, owned by the Hendry Corp., handled 2,500,000 cubic yards of excavation for a new 9-mile drainage channel in the Atchafalaya basin, Louisiana.

The material pumped contained about 15 per cent solids and was sent through the line at a velocity of 27 feet per second.

Floating auxiliary equipment included the tugboat Annie, a 45-foot dredge tender powered by a Cummins

(*Concluded on next page*)

PROMPT DELIVERY
HAUCK
Oil Burning
Heating & Melting
Equipment

Get Ready Now!

- **Melting Kettles for Tar · Asphalt · Bitumen**
- **Torch Burners for Heating and Thawing**
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On the high road or low road . . .

YOU'LL HAUL WITH POWER!

CHEVROLET

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CHEVROLET TRUCKS

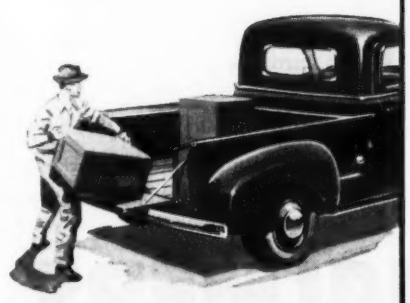
THE CAB THAT "BREATHES" . . . fresh air is drawn in from the outside—heated in cold weather—and used air is forced out!*

Here's "more power to you" on your hauling job—extra power to make "molehills" out of mountains and shorten the long level stretches. It's the famous Valve-in-Head Load-Master Engine in the new Chevrolet Advance-Design trucks. See these trucks of tomorrow—today! They're "loaded" with new features and innovations!

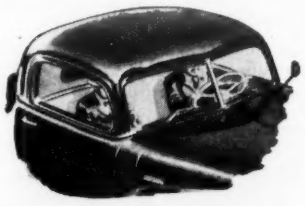
**Fresh-air heating and ventilating system optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

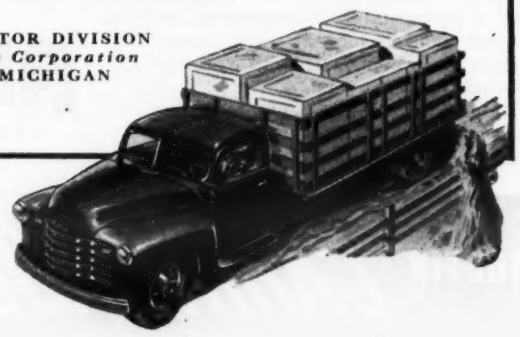
CHEVROLET MOTOR DIVISION
General Motors Corporation
DETROIT 2, MICHIGAN



Panels and pick-ups have **INCREASED LOAD SPACE**—stake and high rack bodies **MORE EFFICIENT LOADING**.... New, stronger, sturdier **FRAMES** are designed to carry greater loads greater distances for a longer time!



The cab is **FLEXI-MOUNTED**—cushioned on rubber against road shocks, torsion and vibration! . . . **DRIVER'S COMPARTMENT** is wider, with more leg room. The seats are fully adjustable, bigger and more comfortable. Wider, deeper **WINDSHIELD** and **WINDOWS** increase visibility by 22%!



LONGER WHEELBASES give better load distribution. . . . Chevrolet's famous **FULL-FLOATING HYPOID REAR AXLES** are geared for the load!

Chevrolet **VALVE-IN-HEAD TRUCK ENGINES** are world's most economical for their size. . . . There are **HYDRAULIC TRUCK BRAKES**, *exclusively* designed for greater brake-lining contact—for positive action!

New Channel Dredged To Link Two Bayous

(*Continued from preceding page*)

240-hp diesel engine which was used to tow the dredge, and other heavy equipment. Other towing was done by the No. 2, a 40-foot tender driven by a Caterpillar 120-hp diesel engine. Ranges were set and soundings taken from the 18-foot Penyan, powered by a Graham 55-hp gas engine.

The St. Louis consumed 3,000 gallons of diesel fuel oil every 24 hours. Its 30,000-gallon storage tank was replenished with Gulf oil towed from New Orleans 100 miles in barges holding 2,000 barrels. Drinking water was also brought in on the same barges to keep full the 30,000-gallon tank on the dredge which has its own chlorination system. The diesel engines also used 30 drums of lubricating oil per month. This was supplied by the Texas Co. with trucks hauling the oil drums from Morgan City to a dock on Bayou Boeuf whence the tenders picked them up and brought them to the dredge.

Personnel

Personnel of the Hendry Corp. included W. D. Jones, General Superintendent; and Captain Bert Cameron and Thomas Achard, Master and Chief Engineer, respectively, of the dredge St. Louis. Captain F. M. Hendry is President of the Hendry Corp.

Supervising the contract for the U. S. Engineers was H. K. Lee, in charge of field headquarters at Morgan City, assisted by W. D. Stockman. R. L. Wright was inspector on the dredge. The New Orleans District is headed by Col. John R. Hardin, District Engineer.

Foot-Operated Jack

A portable hydraulic jack unit for use in equipment maintenance and repair has been announced by the Munton Mfg. Co., Franklin Park, Ill. A feature of the unit is a foot-operated pump which allows the mechanic to keep both hands free for work. The standard Mobil-Powr unit consists of the jack, pump, and 8 feet of hydraulic line with a swivel coupling.

Special attachments for converting the jack to other uses include a press frame, pulling bars, lifter bars, jack plates, extension rods, couplings for rods, and a C-clamp.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 38.

Porcelain-Enamel Signs

Porcelain-enamel signs which give warning of dangerous areas or practices are made by the Industrial Products Co., 2914 No. 4th St., Philadelphia 33, Pa. These signs can also serve as notices of no parking, no admittance, restricted zones, men-at-work zones, exits or washrooms, etc., with wordings selected by the buyers.

The Ipco stock accident-prevention signs are made of 18-gage Armco iron and finished in porcelain enamel. They are provided with the necessary holes for mounting.

A bulletin describing the stock signs has been prepared by the firm and can be secured upon request. It shows representative samples of the signs made, and can serve as a guide for ordering special signs. It is printed in color to show some of the recommended color schemes.

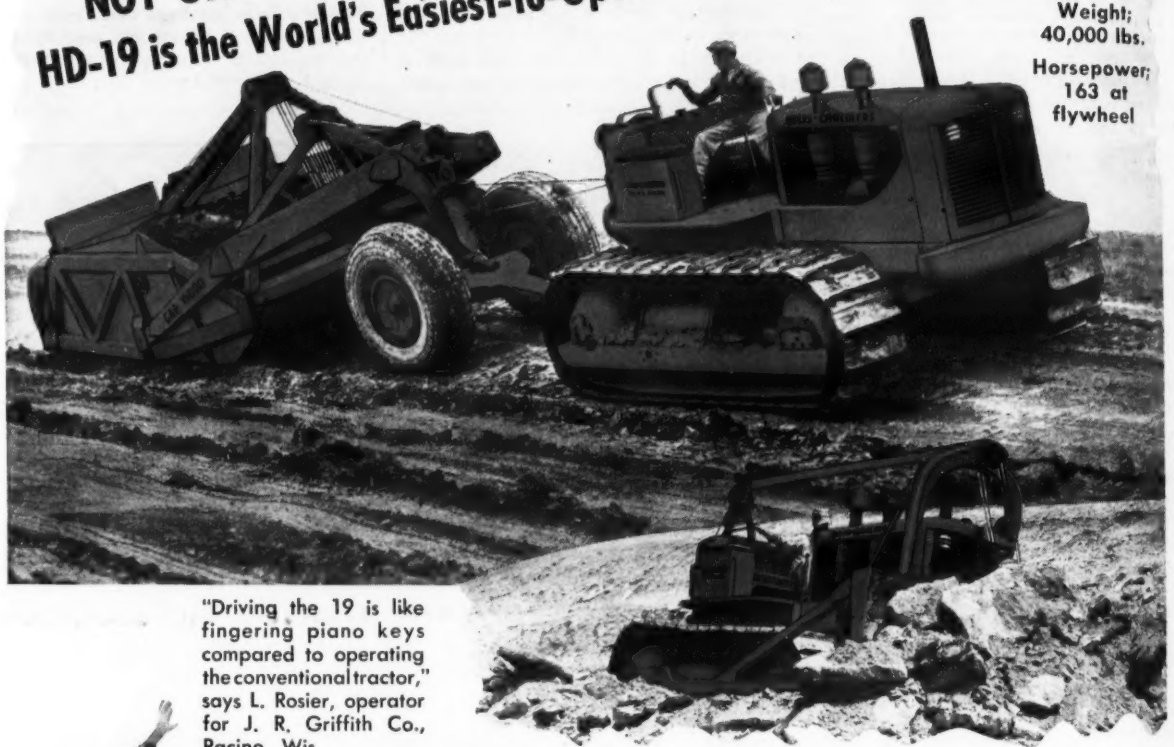
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 63.

Atkins Appoints Hermann

Paul R. Hermann has been appointed Manager of the Chicago branch of E. C. Atkins & Co., saw manufacturer located in Indianapolis. Mr. Hermann has been with the firm since 1926.

An Operator's Dream Tractor

NOT ONLY THE WORLD'S LARGEST, MOST POWERFUL...
HD-19 is the World's Easiest-to-Operate, Most Comfortable Tractor



"Driving the 19 is like fingering piano keys compared to operating the conventional tractor," says L. Rosier, operator for J. R. Griffith Co., Racine, Wis.

Yes, it's a pleasure to operate the NEW Allis-Chalmers HD-19, hydraulic torque converter tractor. Everything possible has been done to make the operator's job easier.

Shifting is practically eliminated. There are only TWO forward gear ratios — 0 to 3.0 and 0 to 7.0 m.p.h.; ONE reverse, 0 to 5.5. Torque converter makes this possible — automatically selects the maximum speed in each of these wide speed ranges at which load can be moved.

No fighting with steering levers and brakes, either. There's hydraulic, finger-tip steering — just a slight pressure on the lever and the tractor turns immediately — and stays turned, no bouncing back. For a full turn, the slight pressure on the lever plus resting the foot on the self-energizing brake does the job — no tiresome pulling and pushing.

Other operating advantages include electric starting, a new type, adjustable split seat . . . wide arm rests . . . adjustable brake pedals . . . full visibility . . . comfortable foot rests and a clean platform.

A faster-working, more powerful tractor, more easily operated, means greater production . . . more yards moved day in and day out.

ALLIS-CHALMERS
ORIGINATOR OF THE TORQUE CONVERTER TRACTOR
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MARTIN CARRYHAUL TRAILERS
TRADE MARK REGISTERED

MARTIN CARRYHAUL TRAILERS
"Make Hauling A Pleasure!"
Ease of loading, dependability and economical operation are three Martin CARRYHAUL Trailer characteristics which make them the leaders in the field.
Regardless of your hauling job, there's a proper size Martin CARRYHAUL Trailer to do it for you safely and economically.

Your "CATERPILLAR" Dealer is your MARTIN Dealer. See him for your trailer needs.

MARTIN MACHINE COMPANY
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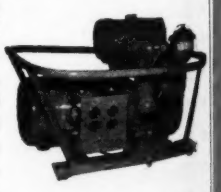
A. C. CURRENT ANYWHERE!
with
KATOLIGHT PLANTS AND GENERATORS



Furnish the same kind of Current as the highlines. Sizes 500 watts to 100 KW. Also manufacturers of Rotary Converters, Frequency Changers, 32 and 110-volt D.C. motors in ¼, ⅓, and ½-hp. A.C. motors (high line) in 1½ and 2-hp. only.

KATOLIGHT, 118 MAXFIELD AVENUE MANKATO, MINN.

This hydraulic spreader of abrasives and chemicals for ice control can be attached to the rear of any dump truck with a power take-off. It is made by the Hydro Spreader Corp.

Hydraulic Spreader For Sand, Chemicals

A hydraulically controlled road spreader has been developed by the Hydro Spreader Corp., Waukesha, Wis. It is designed to simplify the problem of sanding icy or snowy streets and highways. It can be attached to the rear end of any dump truck equipped with a power take-off.

When the dump body is elevated, an agitator carries the sand to an opening where it falls onto a rotating distributor which spreads the sand, cinders, other abrasives, or chemicals on the highway. A portion of the material is thrown ahead of the rear wheels to provide traction for the truck.

A pressure relief valve in the hydraulic system is said to provide a cushion of protection in case of bricks, stones, or other obstructions. Speed of the rotation distributor can be increased or decreased, thereby providing positive control of the amount and direction of the material being distributed.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

New AC Arc Welders Feature Dial Control

New ac arc welders are announced by the Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis. They are offered in intermittent industrial and heavy-duty models ranging up to 625 amps. Feature of the new P&H arc welder is its dial control; it is also designed for remote control.

Dial-lectric control is said to eliminate the need for moving coils or cores, worm gears, sprockets, and chain or lever adjustments. According to the manufacturer, current selection is made by turning the dial; there is no need for added or auxiliary current boosters. This ac welder has both a high and a low welding range indicated on the dial.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 99.

Grinder and Buffer Data

A line of grinders and buffers for general shop use is described in a bulletin being distributed by the Baldor Electric Co., Apparatus Dept., 4357 Duncan Ave., St. Louis 10, Mo. The units are made in either bench or pedestal-mounted models.

Bulletin No. 321-C covers the entire Baldor line which contains units from ¼ to 3 hp, for single phase or polyphase, for 60, 50, or 25-cycle ac, and for dc. Wheel sizes range from 6 to 12 inches. The folder shows several models, lists current requirements, and gives other features. It also shows some accessories for use with these tools, including the diamond-wheel dresser and illuminated eye shields.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 62.

In the high-dune area of the Arizona desert, this custom-built Kenworth truck pauses in this position while engineers test the action of the axles.

Sand-Riding Trucks

Trucks for use on desert sands have been developed by the Kenworth Motor Truck Corp., 8801 E. Marginal Way, Seattle, Wash. They will be used by the Arabian-American Oil Co. in oilfield development and the construction of an oil pipe line in Saudi Arabia.

The Kenworth trucks, some of which will be used with semi-trailers, will handle gross loads up to 47 tons with pay loads of 27 tons. Their chassis frames weigh approximately 14 tons. Of the 6 x 6 type, they will be equipped with low-pressure sand-type tires.

They are also equipped with Hall-Scott 400 engines. Because air temperatures are so high, the trucks will carry a double radiator. Gasoline-tank capacity will be 300 gallons.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 44.

you buy

CONVERTIBILITY

with the Sargent Overhead and Sargent Tractor Accessories

With the Sargent Overhead you immediately *convert* your tractor into a power shovel. . . .

And in a few minutes you can *convert* this unit into a bulldozer or anglegrader. . . .

Add a Sargent Backhoe to your kit and you *convert* to a ditch digger that's rugged, fast and profitable. . . .

Replace the digging bucket with a snow bucket and you *convert* the machine into a snow loader that has many advantages over the bucket type.

You buy *Convertibility* with the Sargent Overhead and Sargent Tractor Accessories. . . .

Ideally suited for small contractors and municipalities who have a variety of different jobs but not enough volume to keep several single purpose machines busy.

With the Sargent Overhead and Sargent Tractor Equipment many, many jobs are well done at small operating cost and small investment.

The Sargent OVERHEAD

For Details See Your OLIVER-CLETRAC DEALER

Manufactured by MAINE STEEL, INC., South Windham, Maine

ROAD SIGNS AUTOMATIC TYPE

3 ft. or 4 ft. furnished complete with sign and 2 red flags. Beside the sign illustrated herewith we supply wording as follows: "Danger," "Danger Men Working," "Men Working Above." Also have other types.

BARTLETT MFG. CO.
3003 East Grand Blvd. DETROIT 2, MICH.

Arm, column, and base have been combined in one piece in the Raydol Woodworker, to eliminate parts and to increase accuracy and rigidity.

Radial Saw Features All-One-Piece Design

A radial woodworking saw in which the arm, column, and base have been combined in one piece has been announced by the Cottom Engineering Corp., Bartlett, Ill. Other features claimed for the Raydol Woodworker include automatic position finders, balance in all positions, frictionless carriage, completely enclosed motor, fewer parts, and portability. Design of the motor allows the use of the cutting tool to within 2½ inches of the center of the arbor.

The one-piece aluminum arm-column-base design is said to eliminate many parts and to increase accuracy and rigidity. The frictionless carriage operates on chrome-steel balls mounted on stainless-steel tracks. The column is supported directly under the worktable, and the elevating mechanism is counterbalanced. Positive locating at common positions is accomplished with an automatic position finder, said to be accurate within 1/64 inch.

Specifications for the unit include: a cut-off of 16 inches, or 22 inches with a column feed; depth of cut, 2½ inches with a 10-inch blade, 1½ inches with an 8-inch dado; a 27½-inch-maximum rip; a ¾-inch-diameter arbor 1⅝ inches long.

The Raydol Woodworker is powered by a 1-hp 3,500-rpm completely enclosed motor for single-phase 110 or 220-volt ac operation. It is connected to the saw by a direct drive. The complete machine weighs 194 pounds, and is equipped with two full-length carrying handles for ease of portability.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 32.

Small-Load Trailer

A 2-wheeled rubber-tired trailer for carrying loads up to 1½ tons is made by the R. J. Piper Mfg. Co., Princeton, Ill. Of the tilting-platform type, it has a 2-way cable for handling the load off or onto the trailer. It comes equipped with a Little Giant 1-ton winch.

Built of heavy planking and steel, with 1-foot-high removable sides, the Piper Speeder Trailer has a jack-knife tongue, which is said to give added leverage for dumping or straightening the load. According to the manufacturer, the trailer will stay level regardless of its load, or pulling unit. It can be equipped with high-speed or heavy-duty tires.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 40.

Schramm Appoints Shaw

Schramm, Inc., West Chester, Pa., has appointed the Shaw Sales & Service Co. as its distributor in California. Located at 5100 Anaheim-Telegraph Road, Los Angeles, Shaw will carry a complete line of Schramm air compressors and pneumatic tools for sale and rental. Parts and repair service will be available in the stores located in Los Angeles and San Diego as well as in Santa Barbara.

Bit-Sharpening Service

A folder describing its services has been made available by the New York Steel & Rock Bit Corp., 1211 Wyatt St., New York 60, N. Y. This firm manufactures moil points, bull points, spades, drill steel, and asphalt cutters. It carries on a sharpening and retempering service for these items and for rock bits and shovel teeth. It also stocks all sizes of hollow and solid drill steel.

The folder lists sizes and prices for the various tools the firm produces, as well as the prices for repair and resharpening of tools.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 58.

HOT or COLD Mix Asphalt

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OIL TANKS
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SIMPLICITY ASPHALT PLANTS

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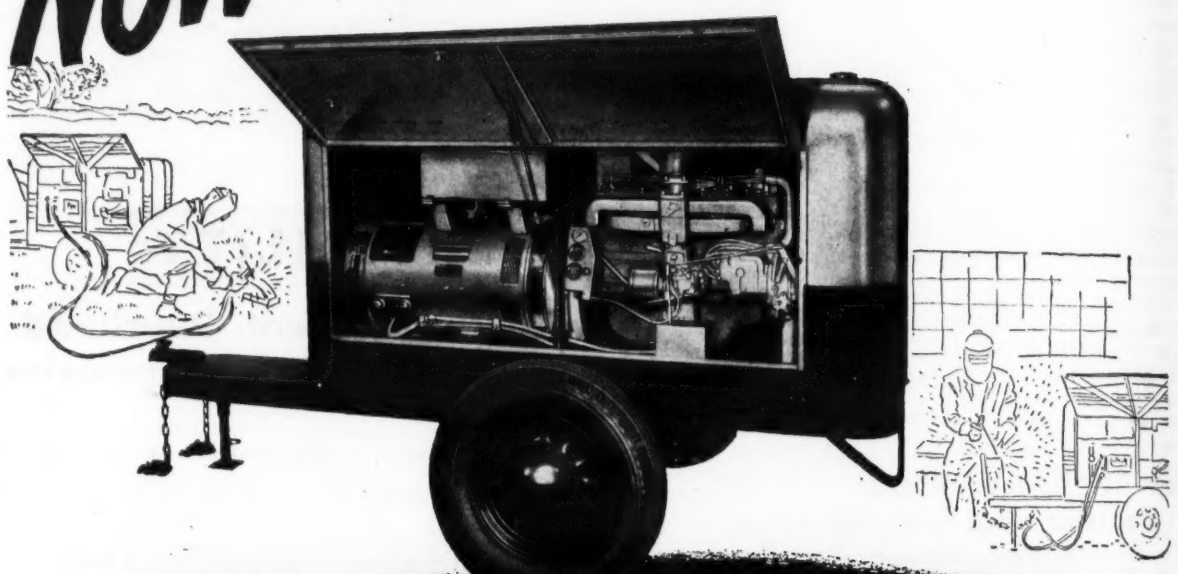


P&H MODEL WN-300 PORTABLE WELDER
A Complete Welding Service IN THE SHOP OR FIELD

Here is a P&H welder that can handle any welding job — *anywhere.* Husky yet easily towed . . . big capacity yet economical, it will save you time, money and headaches. Broken equipment can be repaired right on the job, quickly, easily. Costly delays are avoided.

Powered by a reliable six-cylinder gasoline engine, it can be used in the shop or field. Repair-weld . . . build up and hard surface worn parts . . . . or fabricate metals — it does all jobs. *One simple control* provides any desired welding heat from 30 to 375 amperes. "Visimatic" calibration plate makes heat selection simple, sure.

Price Complete Only $1,133.75!

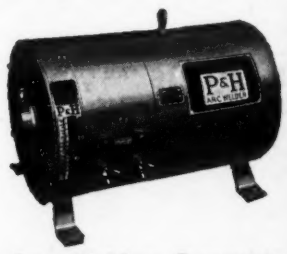
This big, all-purpose welder costs little for the protection it affords against lengthy machine and equipment layups. Often pays for itself in a few jobs by keeping men and machines working. If desired, can be had as four-wheel trailer unit. See your nearest P&H distributor for full information or write for Bulletin W32-5.

P&H ARC WELDERS
4419 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION
ARC WELDERS · EXCAVATORS · ELECTRIC CRANES P&H MOTORS · HOISTS · WELDING ELECTRODES

Stationary Model

The P&H WN-300 Welder can also be had without trailer as a stationary model for $950.00. Perfect for truck mounting. Has convenient lifting hook for crane handling.



Bare Welding Generator

If you prefer to build your own portable welder, you can order the WG-300 generator alone. Has same big capacity, same ease of welding. Simple to hook up to your own engine. Price only $325.00. Ask for Bulletin W33-3.

Conveyor Solves Traffic Problem

Clyde Wood Handles Cars Through Grading Project By Designing Overhead Conveyor Across Highway

(*Photo on page 1*)

+ BY adaptation of the conveyor principle to highway excavation, dirt is being raised, carried across busy U.S. 99 north of Castiac, Calif., and dumped to waiting haul units while a traffic count of 7,500 vehicles per day flows smoothly at reduced speed under the special machine. Without some such technique, the unusual project would have been slower and much more expensive.

The special conveyor is but a part of a vast 40-piece excavating fleet owned by Clyde W. Wood, Inc., contractor for the 2.6-mile section of U.S. 99 to be relocated and widened under a $763,000 California Division of Highways contract. Tournapulls, scrapers, tractors, power shovels, trucks, and earth-fill processing equipment are represented in the Clyde Wood outlay.

The big conveyor was built in a month at the Clyde Wood yard in North Hollywood at a cost of $30,000. It consists of a loading hopper into which a power shovel dumps earth, an inclined conveyor which raises the material about 20 feet above the highway, and a cross conveyor which carries it across the road to a chute, where it is dumped into waiting trucks.

While the machine is in operation, trucks and automobiles pass beneath in both directions at 25 miles an hour. Because the highway at this point hugs the shoulder of a mountain, there was no way of building a detour, as is done in most locations, explained District Engineer S. V. Cortelyou of the California Division of Highways in Los Angeles.

Road Is Heavily Traveled

Highway 99 is now the most heavily traveled freight arterial highway in the west—perhaps in the nation—with heavy trucks making up about 20 per cent of the count. The new highway will have four 12-foot lanes with a 6-foot-wide dividing strip, and paved shoulders 9 feet wide on both sides. It will have a crushed-rock base varying from 6 to 14 inches thick, with an asphaltic-concrete riding surface and shoulders.

The Wood contract is a part of a comprehensive program aimed ultimately at making U.S. 99 a four-lane highway from the Canadian to the Mexican border. It replaces the 14-year-old 3-lane portland-cement-concrete pavement put down in 1933. The old 30-foot pavement has handled an enormous volume of motor traffic in its day.

Started March 13 this year, earth-moving on the Wood contract will total about 700,000 cubic yards, with deposits as heavy as 100,000 cubic yards along one mountain point to be moved by power shovel and the special conveyor. There are also some 4,000-foot one-way hauls up a 6 per cent grade, which are being handled by Tournapulls and which will be described later.

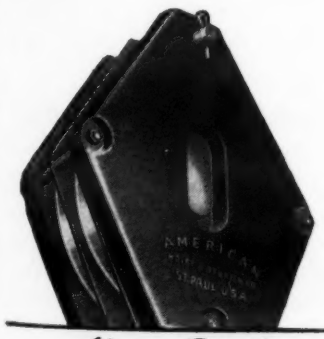
C. & E. M. Photo

A LeTourneau Super C Tournapull, traveling on U. S. 99, hauls a load of earth from the big cut in the background. The units make a round trip on the 4,000-foot one-way haul in 12 minutes, despite a 6 per cent upgrade on the way to dump.

Conveyor Construction

The special conveyor was fabricated in the North Hollywood yard of Clyde W. Wood, using various equipment for the finished product. The 10-cubic-yard feeder hopper was welded from plate-steel stock. The feeder was made out of the base of an old Allis-Chalmers Model L tractor, with a double set of tracks placed side by side to move the dirt out to the inclined conveyor. The tractor-feeder was set in place upside down from its normal position as a trac-

(*Continued on next page*)



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and you'll get blocks and sheaves with
ARMORED CONSTRUCTION!
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Jenny
CLEANS
STEAM CLEANER
CONSTRUCTION EQUIPMENT
8 to 10 Times Faster

Increases "On-The-Job" Efficiency
Cuts Repair Time As Much As 40%
Saves Time · Labor · Money

Accumulations of mud, dirt, and grease on construction equipment, impair the working efficiency of both men and machines. Cleaning with scraper and hose, and scrubbing with gasoline is time-consuming, expensive and often a hazardous operation. Yet cleaning—*thorough cleaning*—of all types of equipment, can be done quickly, safely and inexpensively with Hypressure Jenny Steam Cleaner. *One man using Hypressure Jenny, can clean more equipment in a single hour than ten men can accomplish in the same time by hand methods.*

JENNY speeds repair time, too. For actual time studies reveal that when machines needing repair are first steam cleaned with Hypressure Jenny, 40% of your mechanics' time is saved which otherwise would be wasted wiping dirt and grease from tools and equipment.

We will be glad to send you, without obligation, complete details on how Hypressure Jenny Steam Cleaner can save you time, labor and expense on all your cleaning jobs.

Write today.

HYPRESSURE JENNY STEAM CLEANER

. . . is a self-contained, compact, portable unit easily moved from one cleaning job to another. Cleaning is accomplished by a highly atomized mixture of steam, hot water and cleaning compound applied under pressure through an adjustable spray nozzle. Hypressure Jenny is so safe and easy to use that ordinary labor can operate it.

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C. & E. M. Photo
Working on the fill behind the dual sheepsfoot roller in the background, a soils technician carefully samples the fill density on the Clyde W. Wood job.

Conveyor Helps Solve Job Traffic Problem

(*Continued from preceding page*)

tor frame, so that it would work as an earth feeder.

The inclined conveyor is composed of a 48-inch-wide rubber belt on a 50-foot run, mounted on H-beam and steel-pipe supports. The incline conveyor can be raised or lowered by means of an electric hoist, fastened to the top of the H-beam tower.

The cross conveyor is also a 48-inch belt, on a 60-foot-long straight run. A 2-inch water pipe carries a steady supply of water, regulated by the conveyor operator, which wets the material as it is dumped to the truck beds. A General Electric motor is used to drive the cross conveyor, the incline conveyor, and the feeder. These motors get their electricity from a portable 85-kw generator driven by a Caterpillar D13000 diesel; the generator is truck-mounted and carried along with the conveyor.

The conveyor is mounted on an all-welded angle-iron framework, carried on 6-inch steel-pipe legs and braced with 4-inch pipe. The pipe tripods which carry the conveyor are mounted with rubber tires, for mobility. However, as much as 100,000 cubic yards of earth can be handled at one set-up without moving the conveyor, simply by using a D8 Caterpillar and bulldozer at the top of the mountain to push the material down in front of the Koehring 801 shovel that feeds the conveyor.

Material being handled by the conveyor is typical of the bulk of yardage in the job. It is a metamorphosed silty formation, which tests slightly higher in density than a true silt.

It is estimated by Stanley Wood, Project Superintendent, that the use of this conveyor has at least doubled the output of the Koehring shovel from what it would have been had traffic interfered with the shovel's work. As it is, the output of the Koehring machine is now near its designed peak, governed only by the ability of haul trucks to shuttle back and forth between the end of the conveyor and the fill, about 1,200 feet away. Six 9-cubic-yard trucks of various makes are being used under the conveyor.

Other Methods Also Used

More than half the total yardage, accessible for movement by standard methods, is being handled either by truck and shovel or by tractor equipment.

Five LeTourneau Super C Tournapulls, with a D8 pusher tractor, are being used for some of the long-haul work. The Tournapulls are handling a great deal of earth from one side of the highway to the other by merging with automobile and truck traffic for more than ½ mile, and leaving the traffic stream on the opposite side of the highway. The usual haul for Tournapulls is around 4,000 feet one way, with the added disadvantage of a 6 per cent upgrade during the part of the trip when the machine is loaded. The Tournapulls, which were timed by the Superintendent and Resident Engineer for several days before the job was visited, were making a round trip on the 4,000-foot one-way haul in 12 minutes. This was an improvement from 13 minutes in the past, caused by traffic on the highway which slowed down the Tournapulls.

For short-haul work on one side of the highway, Wood uses two LeTourneau 25-cubic-yard Carryalls behind Caterpillar D8 tractors; two 13-cubic-yard LeTourneau Carryalls with the same prime power; and a D8-towed Gar Wood 20-cubic-yard scraper.

All of these tractor-equipment combinations are also boosted, during the loading operation, by D8 pusher cats.

A small fleet of five K-8 International dump trucks is also in use with a Lorain Model 79 power shovel. This outfit is of course worked as a single unit, with the designated excavation area designed for a specified fill. Where the banks are so high as to invite under-cutting, the dirt is fed off the top to the shovels by a D8 Caterpillar bulldozer.

Fills Are Well Built

When the job was first begun, the contractor placed 14,000 linear feet of 6-inch wartime-invasion pipe, and 14,000 feet of 4-inch line to furnish a good water supply all over the job. The addition of water is not stinted in any fill.

Using two United Iron Works 4-inch 6-stage pumps to boost water about 5 miles from an irrigation ditch, the Wood company is distributing water from tank spigots, from hose outlets. And a 2-inch water pipe is in use, as previously mentioned, on the end of the conveyor.

The material being processed will pack 126 pounds per cubic foot, dry weight, at 90 per cent of its optimum laboratory density. The optimum moisture content for this material, determined from tests, is about 12 per cent, but excellent results are being produced by running the material slightly above that water content, though not over 14 per cent. On some of the smaller fills, this water is added by a workman with a rubber hose. Two water-tank trucks, one 4,000-gallon and one 2,000-gallon, are also in use.

The dirt is being put down in lifts not to exceed 8 inches, spread to the required thickness by bulldozers or a Caterpillar No. 12 motor grader on the job, and rolled by three Southwest sheepsfoot rollers and one LeTourneau roller. The use of tandem sheepsfoot rollers on the job gives better than 90 per cent of optimum density in less than half the number of passes required for one roller. Two tandem rollers are kept busy, with Caterpillar D8 tractors towing them.

With about 7,000 cubic yards of fill going in every day, a laboratory crew employed by the State Division of Highways works full time 8 hours a day keeping up with necessary sam-

(*Concluded on next page*)

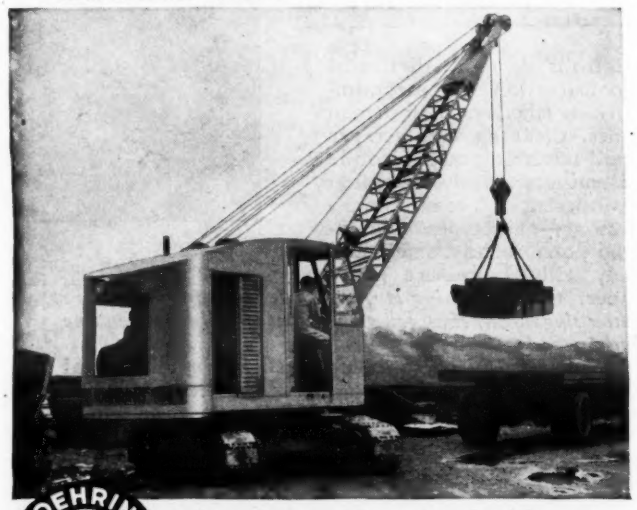
KOEHRING HEAVY-DUTY HALF YARD

2-in-1 SHOVEL BOOM Cuts Cost 30% When You Add Backhoe to Shovel

INDEPENDENT TRACTION Steps Up Crane, Clamshell, Shovel Output

Husky 2-in-1 Shovel Boom meets both shovel and backhoe requirements, makes trench dressing easy. Boom does not "weave."

Because the 2-in-1 Shovel Boom is standard equipment on the Koehring 205 shovel, backhoe job profits can be yours with only small additional investment. Same boom serves both attachments. Front end equipment to convert Koehring 205 shovel to backhoe costs approximately 30% less than with machines using conventional backhoe attachment with special boom. You get a huskier shovel boom PLUS a rigid backhoe boom that never weaves. Backhoe dipper never turns away from cut. Backhoe sidecutters can be used to full advantage in widening trench or dressing side of basement excavation. Because 205 does complete job, hand finishing is unnecessary. Low investment cost on backhoe attachment increases profits on both shovel and backhoe work.



Independent travel — travel while you swing, hoist boom or load — makes travel-time productive time with any front end.

Swing and Hoist While You Travel

With the Koehring 205, you don't lose productive time while getting ready or worry about boom clearance when you turn. You can swing, hoist load, or change boom angle as you travel. Or you can carry on all four operations — travel, swing, raise or lower load and operate boom hoist — all at the same time. You never stop work to maneuver the turntable into a precise, hard-to-reach travel or steering position. With the Koehring 205, you steer and travel with turntable in any position. This is a valuable time saver in tight quarters. You can often work as you travel. Because you handle several operations simultaneously, move-up time is no longer unproductive. With any front end, you get more work done every shift.

KOEHRING HEAVY DUTY

KOEHRING COMPANY Milwaukee 10, Wisconsin

pling. The conveyor works 16 hours per day; tractor equipment, 8.

Personnel

The grading operation is being conducted under the supervision of S. V. Cortelyou, Division Engineer of the California Division of Highways, with headquarters in Los Angeles. The project was designed under the general supervision of George T. McCoy, State Highway Engineer, who is in charge of all state highway projects. Roy Cooley is the Resident Engineer.

On-the-job officials for the contractor include Superintendent Stanley Wood, with W. M. Myers as his Assistant and B. M. Cameron as Master Mechanic.

When grading is finished late this year, Southwest Paving Co. will place the plant-mixed bituminous surfacing under a subcontract.

Iron and steel scrap is desperately needed to keep our steel mills at high capacity. Be sure yours is turned in.

Hammermill, Impactor Rock-Crushing Units

Rock crushers in both hammermill and impactor types are made by the Pennsylvania Crusher Co., Liberty Trust Bldg., Broad and Arch Sts., Philadelphia, Pa. Both types feature reversible rotation in order to increase the life of crushing parts and to reduce maintenance costs.

The impactor consists of two symmetrically placed anvil assemblies served by a rotor. Crushing is accomplished by the arms of the rotor hitting the rock—while suspended in air—against the sides of the anvil. The size of the fines produced will depend primarily upon the speed of the rotor.

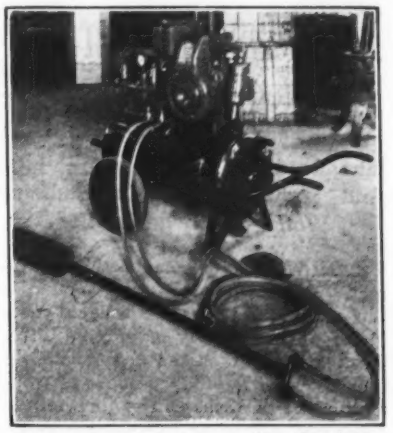
Pennsylvania's reversible hammermills may be considered as having two related crushing zones. In the first, impact blows project the feed at high speed against imperforate anvil surfaces. Final reduction of this material occurs in the secondary zone, where the hammers operate with relatively close cage clearances.

Speeds of the hammermills range from 600 to 1,800 rpm, determined by rotor diameter, size and crushability of feed, and fineness desired. The number, type, and arrangement of the hammers will also affect the operating speed. Capacities range from 2 to 600 tons per hour.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 25.

New Flame-Thrower Serves Dual Purpose

A dual-purpose flame-throwing unit has been developed by the Bready Bros., 5003 No. Cumberland Blvd., Milwaukee 11, Wis. Because of the burner nozzle construction, the unit can also be used as an atomizer for spraying weed killers and insecticides, as well as for thawing frozen aggregates, culverts, etc., heating water and similar winter tasks.



The burner nozzle on the Torcheat flame-throwing unit was developed first to give correct fire, and second to serve as a big-volume spray nozzle for weed killers, insecticides, etc. The unit will also deliver high-pressure air for tires, air tools, etc.

According to the manufacturer, the Torcheat unit burns from 4 to 24 gallons of No. 3 fuel oil per hour, and develops temperatures of 2,600 to 2,700 degrees F. The complete unit consists of the high-pressure fuel and air tank of approximately 30-gallon capacity, an air-cooled gasoline engine, air compressor, oil-burner element and extension, two lengths of high-pressure hose fitted with air-hose couplings, drives, belts, strainers, valves, pipe, and the necessary controls.

Flame is controlled at the burner, where the size of fire is determined. Standard operating range is about 100 feet. In addition to its use as a portable heat unit and as an atomizer, it can also be used as a source of air for tires, air tools, etc. It will deliver high-pressure air at a rate of from 7 to 8 cfm.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 30.

Davey Appoints Dealers

A Class A direct factory dealer and eight new dealers and distributors have been appointed by the Davey Compressor Co. of Kent, Ohio. The factory dealer is Salmon & Co., Inc., Birmingham, Ala. The territory assigned consists of the counties north of, and including, Sumter, Greene, Hale, Perry, Chilton, Coosa, Tallapoosa, and Chambers. The complete Davey line will be handled.

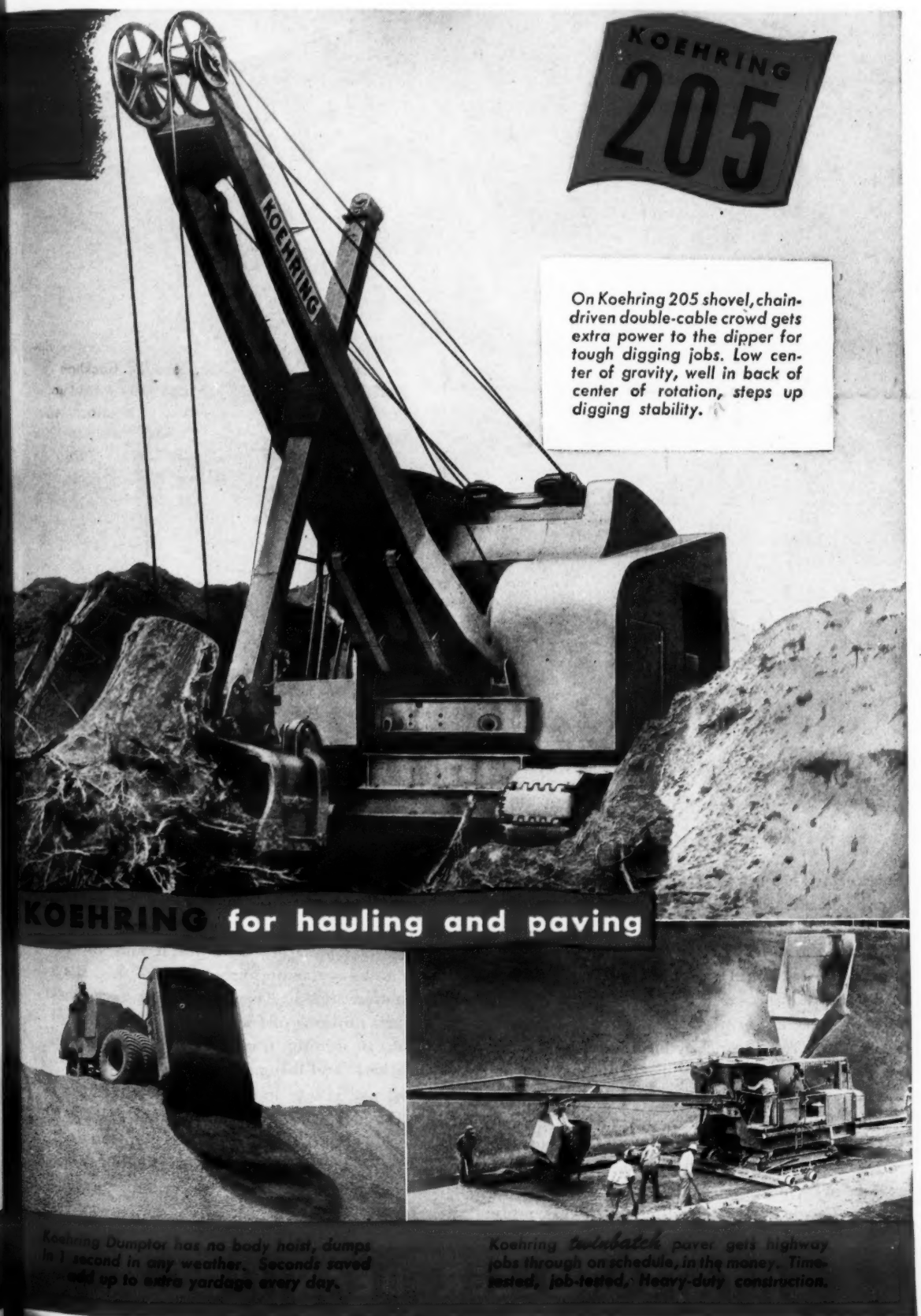
Other full-line distributors of Davey portable and stationary compressors, lighting equipment, and truck power take-offs are: National Equipment Co., 510-512 So. Clay St., Louisville, Ky.; M & F Equipment Co., Albuquerque, N. Mex.; C. H. Jones Equipment Co., 236 W. South Temple St., Salt Lake City, Utah; and the J. W. Grass Equipment Co., 671 Ford Place, No. E., Atlanta, Ga.

Named as industrial - compressor dealers are Summit Hardware Co., 991 River St., Akron, Ohio; and the Portable Service Equipment Co., 3529-31 Front St., No. Philadelphia, Pa. Warner & Derickson, Inc., 644 State St., Toledo, Ohio, has been appointed to handle Auto-Air and Track-Air compressors, and heavy-duty truck power take-offs. William S. Bolden Co., 814 Washington St., Charleston, W. Va., will sell and service Air Chief portable and industrial compressors. This firm has branches in Wheeling and Parkersburg.

Road Assn. Opens Office

The Carolina Road Builders Association has announced the opening of a branch office at 1109 Pendleton St., Columbia, S. C. The new office is under the supervision of Dan T. Henderson of Greenwood, S. C.

Principal functions and operations will be continued from the main office at Room 609, Commercial Bank Building, Raleigh, N. C.


KOEHRING
205
KOEHRING
On Koehring 205 shovel, chain-driven double-cable crowd gets extra power to the dipper for tough digging jobs. Low center of gravity, well in back of center of rotation, steps up digging stability.
KOEHRING for hauling and paving
Koehring Dumptor has no body hoist, dumps in 1 second in any weather. Seconds saved add up to extra yardage every day.
Koehring Tailbatch paver gets highway jobs through on schedule, in the money. Time-tested, job-tested. Heavy-duty construction.

New Machine Vibrates Fines Into Road Base

Introduced on Water-Bound Slag And Stone Courses in Highway Work; It Is Self-Propelled

✦ A NEW piece of construction equipment was introduced this summer in the building of two new macadam roads in Ohio. The recently developed Vibro-Tamper was employed to vibrate the fines down into the coarse aggregate making up the base course for the new pavement. Used on two different contracts, one employing crushed stone and the other slag for the coarse aggregate, the machine nested the fine chips well down into both heavier materials with equal facility.

In each case after the coarse aggregate had been shaped to grade by the usual preliminary rolling, the fines were laid on top. Then the Vibro-Tamper moved over the surface and worked the fines into the base, filling all the chinks and voids. A more compact solid base results when the interstices between the pieces of larger aggregate are completely taken up by the smaller fines for the full depth of the course. Two or three passes over the road were sufficient to produce the desired result. At the rear of the machine is a full-width fiber broom with 6-inch bristles held in a wooden frame. This sweeps along the surplus material. The broom is raised or lowered as desired.

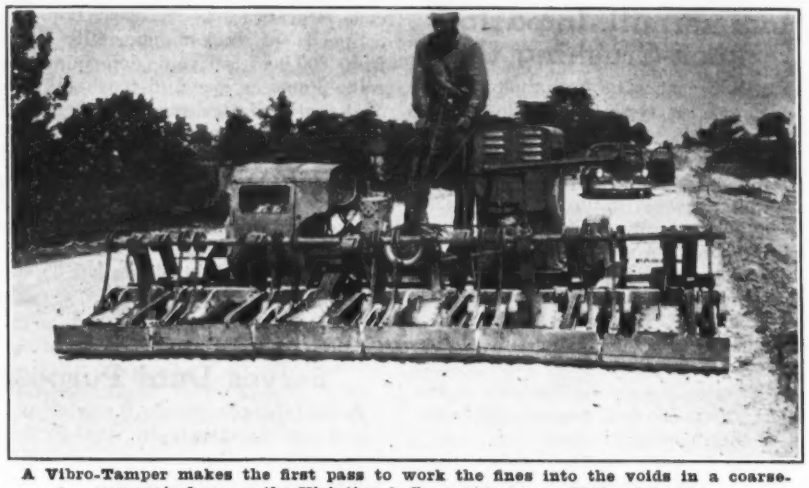
The first contract on which the new machine was used was a 3½-mile stretch of U. S. 250 between Mt. Eaton and Wilmot in eastern Ohio. Contractor Elmer Vogt of Massillon, Ohio, put down the 9-inch macadam base in two courses of slag, a 5-inch bottom course followed by a 4-inch course on top. The machine was used on each lift of the 22-foot pavement.

Shortly after, Visintine & Co. of Columbus, Ohio, used a Vibro-Tamper on its 2.8-mile contract on U. S. 42 near Bellepoint. On this contract crushed limestone was employed as the coarse aggregate for the 9-inch base laid in two 4½-inch courses, 24 feet 6 inches wide.

Vertical-Plane Vibration

The new machine is self-propelled on crawler tracks. It weighs 6,600 pounds and can travel at a speed ranging from 8 to 88 feet per minute. The best vibration speed is from 28 to 30 feet per minute, but this may vary with local conditions. One Wisconsin VE4 gas engine propels the Vibro-Tamper through a chain drive to an Ohio reduction gear with three speeds forward and three reverse for the crawlers. An individual lever controls the crawler track on each side.

Vibration in a true vertical plane is imparted to the road surface through six vibrating shoes, each 16 inches long x 24 inches wide and weighing 285 pounds. The shoes are in line at the front of the machine, giving it a width of 12 feet. This may be changed by varying the number of shoes used. The shoe plates are ⅜-inch-thick steel plates and are cambered on the base so that the area of each shoe in contact with the ground is 2 square feet. By using sectional shoes instead of one full-width vibrating unit, the crown of the road is followed more closely.



A Vibro-Tamper makes the first pass to work the fines into the voids in a coarse-aggregate base on the Visintine & Co. contract near Bellepoint, Ohio.

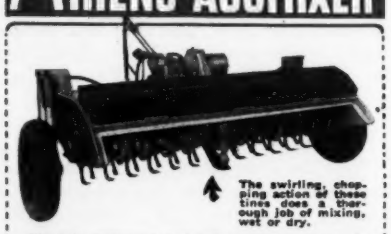
The vibrating units are powered by a second Wisconsin VE4 gas engine through five Goodyear steel-wire rubber V-belts. Each shoe has six built-in Lord rubber dampeners which confine the vertical-plane vibrations to the ground and away from the machine itself. The total unbalance of the weights in each shoe is 16.0 pound-inches, and the speed of vibration ranges from 2,800 to 3,000 rpm.

The actual amplitude of vibration varies with the nature of the surface on which the shoe is vibrating. A hard-resilient surface gives a greater bouncing effect which is lessened on a softer, deadening surface.

The Vibro-Tamper is manufactured by the International Vibration Co. of Cleveland 10, Ohio, and may be either leased or purchased outright.

Adopt the Bond-a-Month Plan. Regular purchase of U. S. Savings Bonds insures your future and your country's.

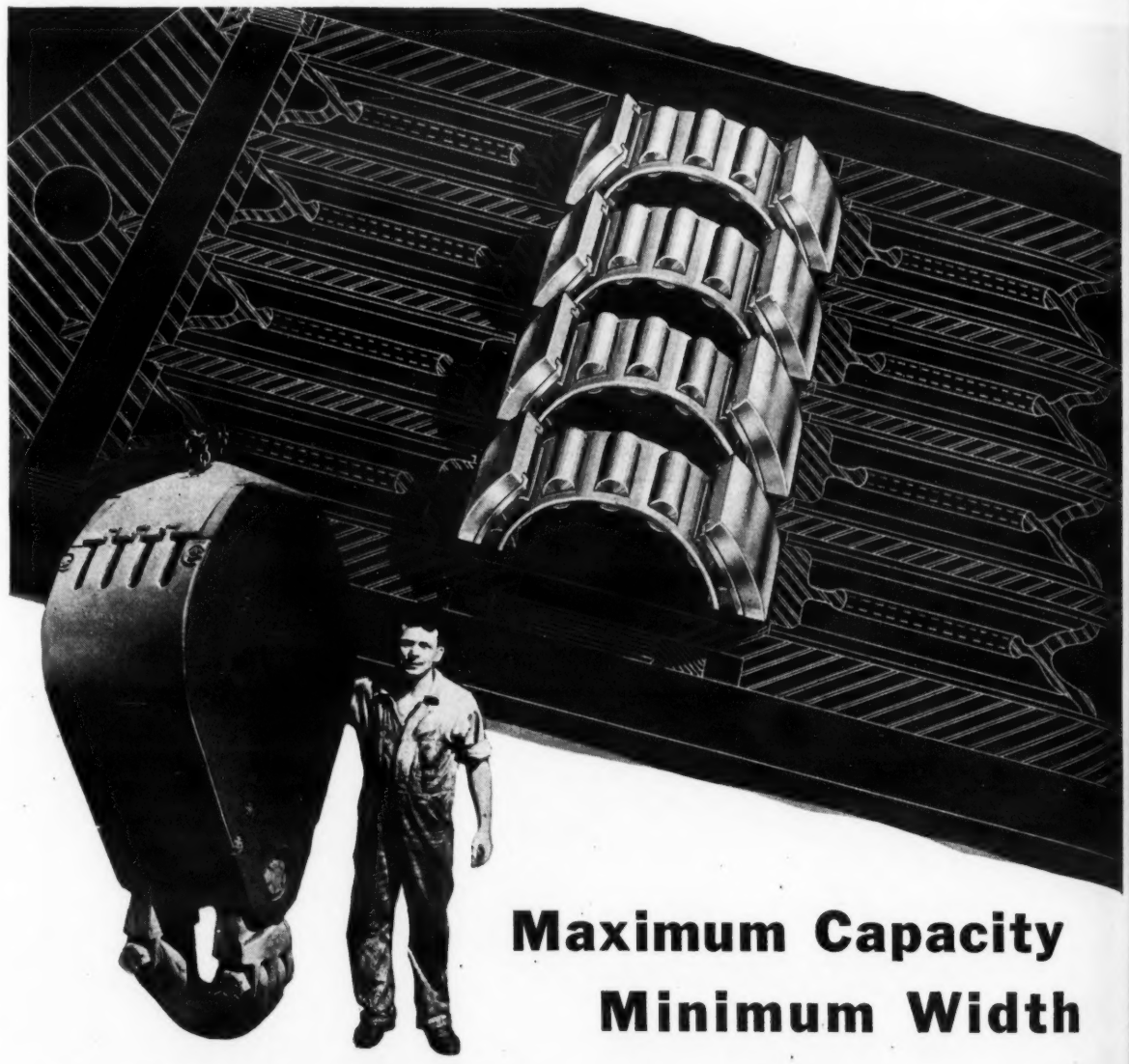
FOR SECONDARY ROAD CONSTRUCTION...
ARIENS AGGMIXER



The swirling, chopping action of these tines does a thorough job of mixing, wet or dry.

HERE'S equipment designed especially for mixed-in-place construction—to operate in connection with other general purpose equipment. Wherever aggregates are used it thoroughly pulverizes, mixes and aerates aggregates with binder—rapidly and economically. Also ideal for soil cement stabilization. Safe and easy to operate . . . adjustable to any tractor . . . made 4 standard sizes, 4', 5', 6' and 7'. Write for details.

ARIENS COMPANY BRILLION WISCONSIN



Maximum Capacity
Minimum Width

Streamlined shape and rugged construction speak for the stamina of this new McKissick Traveling Block. But a look inside, where four Hyatt Roller Bearings carry a 200-ton load, shows how the bearings contribute to highly efficient design and operation.

These bearings are Hyatt Hy-Load Type, which feature high radial capacity for minimum bearing width—making possible the narrow sheaves for block compactness which, in turn, permits maximum derrick working space.

The bearings are used without inner races, the rollers operating directly upon the hardened surface of the pin. Three advantages result: larger pin size for given bearing rating—easier assembly because there are no inner races to apply—better lubrication.

Wherever Hyatts are used you'll find sweeter design and sweeter performance, like this. It's a combination that has won for Hyatt and Hyatt customers millions of friends not only in the oil field, but in mining, transportation, agriculture, construction, and throughout all industry.

It will pay *you* to look into the advantages of Hyatt Roller Bearings for your product, and Hyatt Engineering Service is available to help you do it without cost or obligation. Write to Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

Four axles mark the new Milford special service truck for mounting a crane, winch, or other special equipment. The controls for this equipment are in the rear compartment of the cab so that the driver can turn around in his seat and face his work.

New Truck Chassis For Cranes, Winches

A 4-axle 12-wheel chassis for mounting a crane, winch, or other special equipment has completed its field tests and has now been put on the market by the Milford Crane & Machine Co., Milford, Conn. The dirigible duplex 2-front-axle system is designed for maximum dynamic balance, unit efficiency, and load capacity. The two rear axles are designed for adequate load-carrying capacity.

According to the manufacturer, the front axles are so sprung that the load is equally distributed between them. A steering linkage is employed to provide the correct ratio of steering angles between the axles, under all conditions. Each of the rear axles is of the standard bogie type.

The cab is designed to permit the operator to face the equipment being operated. The seat revolves from the normal driving position to one facing the rear. The operating controls for the crane are located in the rear of the cab so that they do not interfere with the driving controls, do not require the equipment to be run from outside, and allow the operator to remain in his seat.

The Milford special service truck is made in two models: the Model QX is rated at 33,000 pounds, gross vehicle weight; and the Model QY is rated at 48,000 pounds, gross vehicle weight.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 26.

New Hand Razing Tool

A hand razing tool for use by construction gangs is being distributed by the G. P. Grieve Co., 428 Stinson Blvd., Minneapolis 13, Minn. It can be used for tearing down wooden forms, temporary field offices and shops, and similar purposes.

It is made of steel throughout, including the handle and prongs. A cast-aluminum clip is used to control the prong adjustment. It is painted with a rust-resistant aluminum paint. A knurled handle is said to provide easy handling and a firm grip.

In use, the prongs are adjusted so that they will fit over the studding and behind the boards to be removed. A pressure on the handle is then said to remove the board without splintering, cracking, or destroying the lumber.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 43.

Gardner-Denver Changes

The Gardner-Denver Co. has announced the opening of three new branch offices, and a shift in the personnel of its Detroit office. A. C. Beeson, formerly Manager of the Detroit branch, has been called to the main offices in Quincy, Ill. He is succeeded by G. A. Murphy.

The new branch office in New Orleans is located at 1034 Camp St.; in Cleveland, at 8015 Carnegie Ave.; and the Kansas City branch is at 2805 Main St. These new branch offices will sell and service the Gardner-Denver line of rock drills, pumps, compressors, hoists, and drilling engines.

Manual on Service Tunnels

The use of metal underground passageways for aggregate conveyors, underpasses, drainage for highways, etc., is described in a 24-page manual issued by the Armco Drainage & Metal Products, Inc., 703 Curtis Ave., Middletown, Ohio. It features pictures of the Armco products in use, accompanied by text and diagrams.

The manual contains information on the sizes and shapes of openings, how to design and build them, and how to provide necessary appurtenances. Tables give strength and weight data, gages required with various highway loads, details of standard widths and lengths of Multi Plate pipes, etc.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 70.

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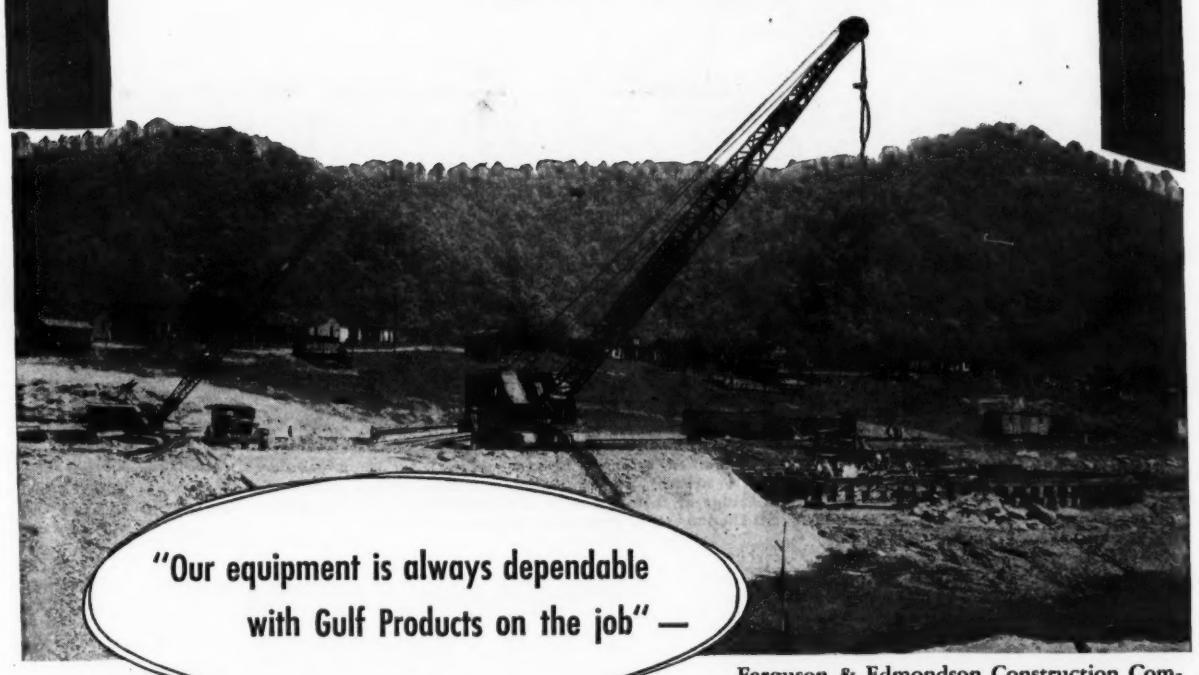

"Our equipment is always dependable with Gulf Products on the job"—

SAYS S. N. CONNOR, SUPERINTENDENT

Ferguson & Edmondson Construction Company, Pittsburgh, Pa., has the contract for enlarging the Chesapeake & Ohio Railroad yard at Shelbiana, Ky. Costing approximately $1,000,000, the job involves moving 500,000 yds. of dirt and constructing turntable, roundhouse, new station and auxiliary buildings.

"WE have our share of worries on a job of this kind," says Mr. Connor. "But lubricants and fuels are not among them—we use Gulf products. Always dependable—in quality, performance, and availability—they help keep our equipment dependable, too. That's one reason we're ahead of schedule on this job."

There are three solid reasons why so many leading contractors specify Gulf quality products. One is performance—less wear and smoother operation for equipment. Another is the high type of engineering service Gulf provides to insure the right types and grades of lubricants and fuels for every unit. Third, Gulf's prompt delivery service.

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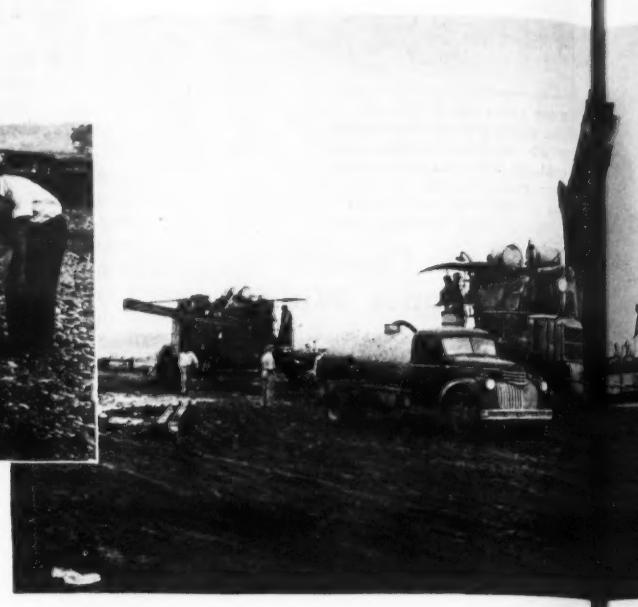
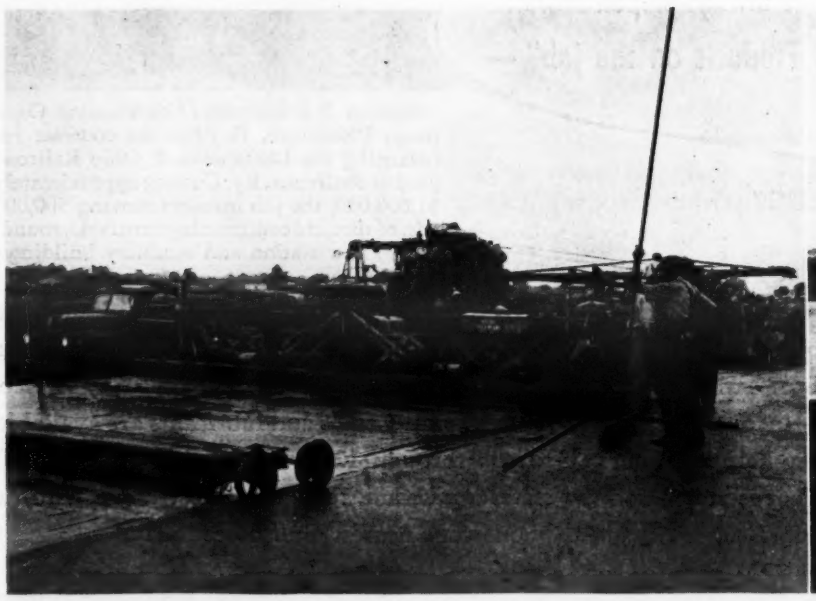
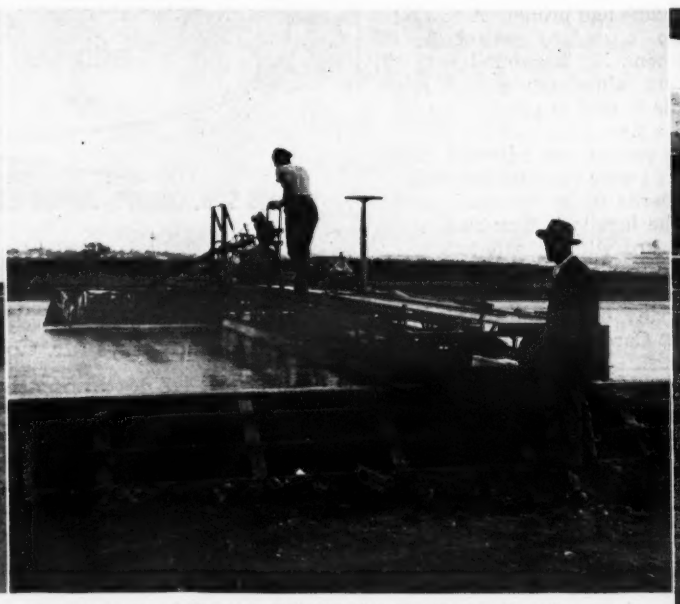


FORMS, PAVERS. A Huber tractor-maintainer transfers forms from hauling wagons to the form trench, using the 8-foot pole of its front-end loader as a boom. The Heltzel 21 and 25-inch forms, specially designed and built, are 12 feet long, weigh 850 pounds, and are reversible for use either on taxiway or runway. There are 4,000 feet of them on the project. At right, two Koehring 34-E Twin-batch pavers with 35-foot booms work from the grade outside the forms, one behind the other. Tank trucks parked alongside supply water for the mix. The laying of runway concrete in 25-foot lanes began in June, 1947, and is scheduled for completion in December.

FIRST CONCRETE COURSE. The first paver deposits a 37.4-cubic-foot batch of air-entrained concrete in front of a Blaw-Knox paddle-type spreader. Trucks, too, haul mixed batches between ¼ and 1½ miles from three central pavers to the forms, where they end-dump them from a bridge or from the edge of a lane already paved. Field working space is too limited for all the pavers to work there at peak efficiency.

MESH REINFORCEMENT. A screed on the spreader levels the concrete to within 4 inches of the top of the slab. It is vibrated by the 6-unit Viber internal gang vibrator across the back of the spreader. Then steel-mesh reinforcement is laid in strips 24 feet 6 inches x 7 feet 3 inches.





JOINT CUTTER. At first, any longitudinal adjustments were made by finishers with straight-edges and long-handled floats; however, a Koehring bullfloat is now in use. Then a Flex-Plane machine, shown here, cuts a groove 5 inches deep x ⅛ inch wide across the concrete every 28 feet for the contraction joints. It is followed by a 3-foot-long burlap drag to remove any laitance.

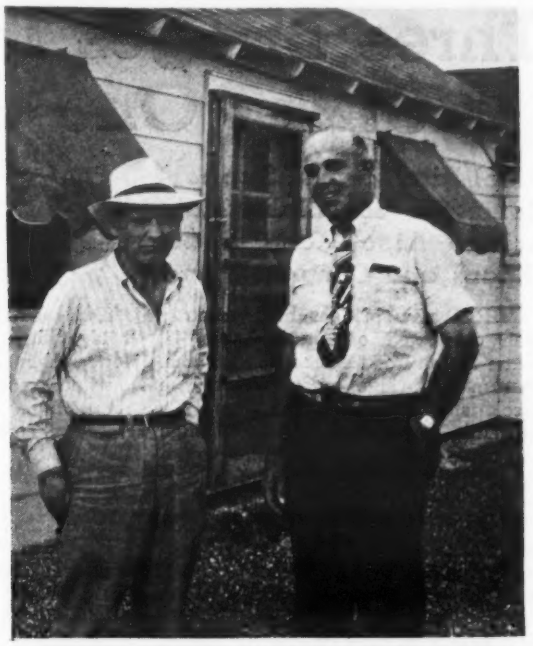
CURING. A Truscon Laboratories spraying unit with a W. G. Chausse pump rides on rails back and forth across this last bridge, applying Tru-Cure membrane curing compound. Protected by a hood against wind, the spray bar covers a 5-foot strip of concrete with the compound at every pass.

B-36 Bombers Require Big Runways

The U. S. Army Air Force Builds A Concrete Runway 10,000 Feet Long By 300 Feet Wide and 21 Inches Thick At Patterson Field, Ohio

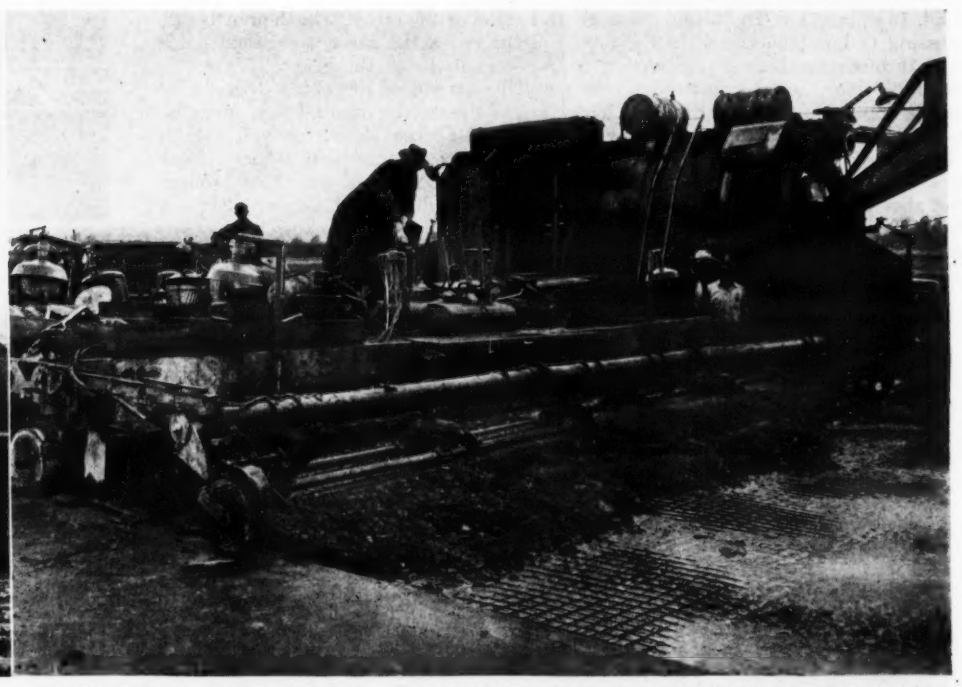
(C. & E. M. Photos)

(See article on page 1)



SUPERVISION. At left is F. G. Dyer, Project Engineer for the Corps of Engineers at Patterson Field. At right is Ralph Beerbower, Resident Manager for the contractor, W. L. Johnson Construction Co. of Columbus, Ohio. The Louisville District which is directing work is headed by Col. B. B. Talley, District Engineer. Major O. M. Haney is Officer-in-Charge.

OND CONCRETE COURSE. Next, the second Koehring paver drops batches over the mesh, filling forms to the top. The paver team places from 275 to 300 cubic yards of concrete hourly. Maximum production to date in a 16-hour day has been 3,108 linear feet of 21-inch pavement 25 feet wide.



FINISHING, VIBRATING. Two screeds on a Jaeger-Lakewood finishing machine strike off the upper 4-inch course of concrete. And two Jackson vibrating tubes on the front of the machine do their work; they extend the full width of the lane and can be raised or lowered to any position. A second Jaeger-Lakewood machine completes mechanical finishing; however, the tube vibrators on this unit are not used.

END OF A POUR. At the end of a day's run a construction bulkhead is installed, using two lengths of 12-foot forms and a special 1-foot section to make up the 25-foot width of lane. Dowels are placed in the joint to form a longitudinal tie with the next day's pour.

JOINT MATERIAL. Philip Carey premoulded bituminous joint material is installed in the bottom 3 inches of the joint, and capped. After the concrete has aged for 5 days, the top portion of the slot is poured with Careylastic rubberized-asphaltic joint material. It is shown here (above) being drawn off into a hand kettle from a White heater, and (right) being poured from the hand kettle in two lifts of one inch each. Two lifts were found best because of a certain amount of shrinkage that occurs.

Three Bridges Built Under One Contract

Steel-Pile Bents Support Concrete Deck Slabs; Main Bridge Also Has I-Beam Spans and Concrete Piers

✦ THREE new bridges have recently been completed on State Route 43, Selma-Sprott Road, in central Alabama. The main bridge over Oakmulgee Creek is 886 feet 10 inches long. To the south 3½ miles is a 136-foot bridge over Childers Creek. And ½ mile to the north is the Oakmulgee relief bridge, also 136 feet long.

The bridges were constructed by Goodwyn & Murphree, contractor of Troy, Ala., for a bid price of $148,793. Just one year was required for the construction, from May, 1946, to May, 1947; delays in steel delivery hindered the progress of the work.

The bridge contract awarded by the Alabama Highway Department was part of the improvement to a 5.8-mile section of road; this section was reconstructed with a 22-foot bituminous surface treatment on a gravel base, flanked by 6-foot shoulders. (See C. & E. M., Sept. 1946, pg. 71.) The original bridge crossing Oakmulgee Creek had a 100-foot through steel truss supporting a concrete floor, with creosoted-timber trestle approaches at either end. It had a 3-inch plank flooring covered with 3-inch wood blocks, with a thin layer of asphalt wearing surface. It was 345 feet shorter and from 8 to 9 feet lower than the new structure. Prior to this improvement a light, narrow, steel pony truss with concrete floor spanned Childers Creek, while only a culvert existed at the site of the present Oakmulgee relief bridge.

Modern Spans

Designed for H-15 loading, all three bridges have 26-foot roadways with 1-foot 6-inch sidewalks protected on the outside by concrete railings 3 feet 3 inches high. All the bridges have steel-pile and concrete abutments. Each of the smaller bridges has three steel-pile intermediate bents and four steel and reinforced-concrete spans, with the deck 6½ inches thick.

The main bridge has nineteen steel-pile and cap intermediate bents, together with one 3-column and three 2-column concrete piers. The south abutment, three of the bents, the three 2-column piers, and one leg of the 3-column pier are on a 45-degree skew. The other leg of the 3-column pier is 90 degrees to the center line of the bridge. This was done to parallel the substructure with the direction of the stream flow at the south end of the bridge, where it crosses the normal channel of the creek. On the north side of the creek the skew was dropped for the remainder of the bridge length.

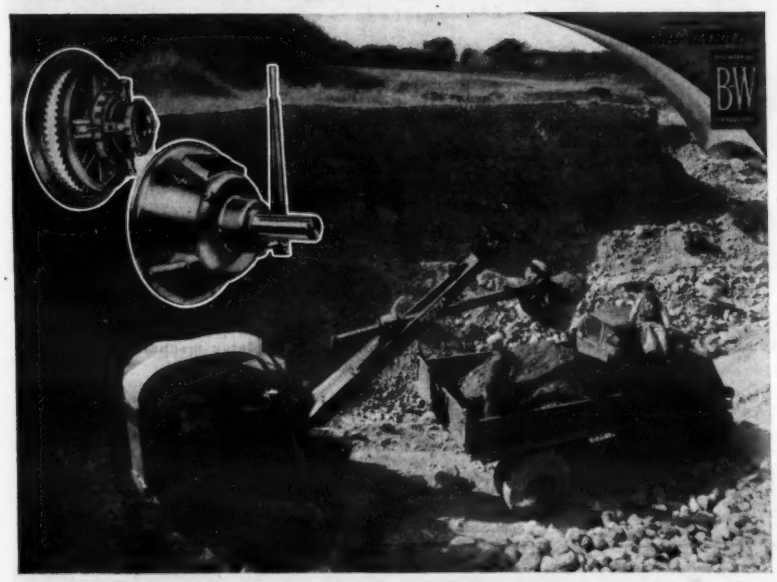
This arrangement required that four out of the twenty-one I-beam spans be on a 45-degree skew, as well as the 50-60-50-foot continuous I-beam spans supported on the piers. The I-beam spans on all the bridges are 34 feet long. To change from skew to tangent, a small triangular-shaped I-beam span with one leg 12 feet 8¼ inches long on the center line of the bridge was built into the structure. On the main bridge the I-beam spans are of composite design. Spiral steel reinforcement is

(*Continued on next page*)

C. & E. M. Photo

This is a photo of the west side of the main bridge built by Goodwyn & Murphree, showing its steel-pile-bent construction. Three guard-rail cables have been strung under the deck to support a work scaffold for cleaners and painters.

ROCKFORD



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*ROCKFORD POWER TAKE-OFFS are designed for generous overload capacity, when the standard length shaft is used and the center of the load is placed at a point half way along the shaft extension. The proportions of the shaft and bearings are determined by the load capacity of the clutch selected.

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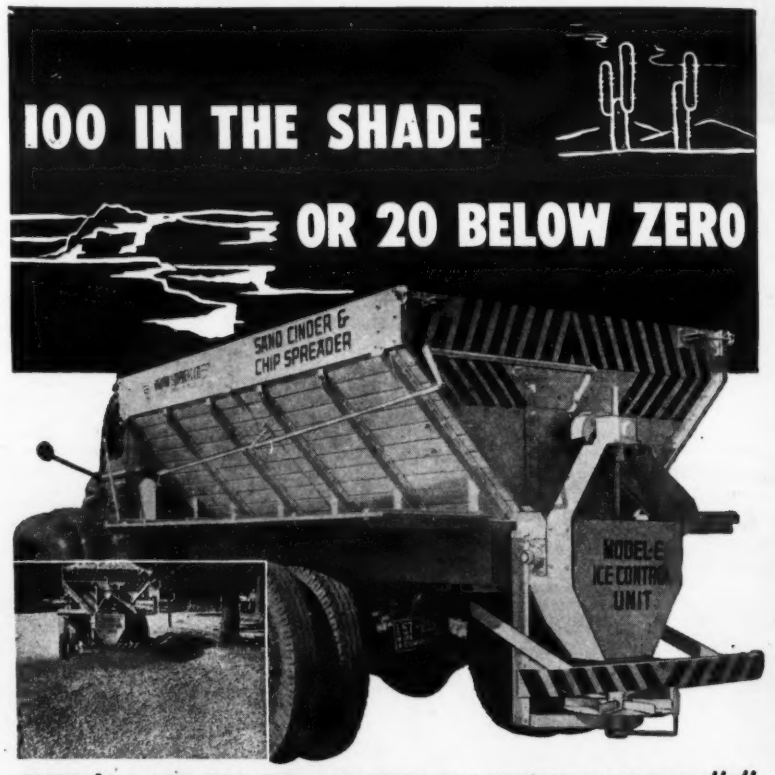

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welded to the top flange of the steel beams that carry the deck slab. This reinforcement serves as a horizontal-shear connection with the concrete.

Detour Bridge

At the beginning of the job the inability of the steel mills to furnish the beams for the bents delayed the pile driving. The contractor, however, built some culverts which were included in the project. This permitted grading operations to proceed on the roadway part of the improvement. He also built a timber detour bridge alongside the existing structure spanning Oakmulgee Creek. In the case of the main bridge the alignment remained unchanged, which meant that the new bridge had to be erected exactly where the old one stood.

The detour bridge was less than 300 feet long, since it did not have to span the creek flats which are dry during normal conditions. It consisted of 4-pile bents on 15-foot spans with the wooden piles ranging in length from 20 to 30 feet. They were driven to an average penetration of 8 feet and capped with 10 x 10 timbers. Between the caps 6 x 12 stringers were laid across on 18-inch centers to support the 3-inch planking. A wooden railing was erected on each side of the 18-foot roadway.

The 10-inch-diameter piles on the main detour bridge were driven with the skid rig that the contractor later used for driving the H-beams in the steel-pile bents. It consisted of 40-foot steel leads mounted on a steel grillage, and was operated by a 3-drum winch powered by a Ford gas engine. One line lifted the piles into position, another raised the 3,000-pound gravity hammer for the 10-foot drop, while the third line controlled the forward and back movements of the driver.

In driving the piles for the smaller detour bridges at the other structures, a Lorain TL 20 crane was used. It was equipped with a 40-foot boom and 22-foot steel swinging leads in which moved a 1,200-pound drop hammer with a 350-pound follow block.

Building the Piers

Advantage was taken of the low-water stage in Oakmulgee Creek from August to October last year to pour the concrete footings for the piers. The contractor did have some steel sheet piling available for this work, but as it was more urgently needed on another job elsewhere he decided to build his cofferdams with wood sheeting.

A Chicago Pneumatic sheet driver swung from the boom of the crane drove the 1-inch sheeting; air was supplied by an Ingersoll-Rand 105-cfm compressor. Four pumps were available for unwatering the cofferdams: one 2-inch and two 3-inch Gorman-Rupps, and a 2-inch Rex. A clamshell then excavated for the footings, removing a combination of sand, gravel, and clay down to a stratum of marl. To assure a good foundation, the top layer of marl was removed with an I-R pavement breaker.

The footings were poured, and after them the riser columns in two lifts to the top which averaged about 35 feet above the foundation. Forms were built from 2-inch shiplap backed with 2 x 6 studs on 18-inch centers. Double 2 x 6 wales were set on from 2½ to 3-foot centers with Medco 5,000-pound twist ties tying the forms together every 3½ feet.

On both the pier and deck form work the bulk of the lumber was cut on power saws. Among such tools were a Delta tilting-table saw with a 10-inch blade operated by a 1-hp motor driven by a Kohler 1½-kw light plant; a Jones 10-inch-blade table saw driven by a Wisconsin engine; and two hand saws—a Black & Decker and a Mall. A couple of Leland 2½-kw light plants were on hand to furnish power for these last tools, and for the Black & Decker ½-inch drills which were used to bore holes in the forms.

Concrete was mixed right at the bridge under construction in either a 2 or 3-bag Koehring mixer. Water was pumped from the creek to a 500-gallon tank by a Myers 1½-inch force pump, and from there to the mixer tank by a small pump on the mixer. The Selma Sand & Gravel Co., delivered sand and

(*Continued on next page*)

C. & E. M. Photo
This Delta tilting-table saw with a 10-inch blade is operated by a 1-hp motor driven by a Kohler 1½-kw light plant. It is cutting form lumber on the deck of the main bridge over Oakmulgee Creek.

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or cause time out

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Three Bridges Built Under One Contract

(*Continued from preceding page*)

gravel to the job by truck after a 5-mile haul, and stockpiled the material where it was needed. Bag cement was supplied by the National Cement Co., of Ragland, Ala., which shipped it by rail to Selma via the Southern Railroad. From there it was hauled to the job on the contractor's International utility trailer truck. The reinforcing steel as well as the spiral pieces were furnished by the Alabama Steel Co., of Birmingham, which delivered it to the job in trucks.

The batches in wheelbarrows were weighed on a Winslow scale. The mixed concrete was chuted into an Insley ¾-yard concrete bucket or into as many as three Insley 6-cubic-foot 2-wheel rubber-tired concrete buggies. When the bucket was used, the crane lifted it to the forms for discharging. The buggies were used mainly on the deck pours after the completion of an initial span to provide working room.

As the batches were poured into the forms, two Mall units vibrated the concrete. Curing was done with wet burlap. This was removed from the slabs after the initial set and replaced with sand that was kept wet for 7 days.

A typical 2-bag batch of concrete had the following weights:

Cement	188 lbs.
Sand	408 lbs.
Gravel	620 lbs.

An average of 10 gallons of water was added to the above materials.

Steel-Pile Bents

By October the steel H-beam piling had arrived and driving got under way. The 10-inch 42-pound H-beams were driven, four to a bent, by the previously described driver. The two inside piles, each 3 feet 10 inches off the center line of the bridge, were driven plumb while the two outer piles were driven on a batter. At the top the four piles were equally spaced 7 feet 8 inches on centers. They were driven to a bearing of 25 tons in the marl which runs back from the banks of the creek. The average penetration of the 30-foot piles was from 10 to 15 feet. They were cut off at grade with a torch.

The bents were strengthened by sway bracing. This consisted of 4 x 3½ x 5/16-inch angles crisscrossing from the four outer corners of the bents. The angles were secured by welds. For a cap, two 12-inch 20.7-pound channels, 24 feet 6 inches long, were fastened to the upper ends of the piles, one on each side, by 1-inch ribbed bolts. On top of the caps five stringers were placed on 5-foot 9-inch centers. The stringers are 18-inch 54.7-pound I-beams reinforced with a 5 x ½-inch x 18-foot plate welded to the bottom flange. The structural steel had been punched by the fabricators, but the contractor field-drilled the piling and reamed the holes, drove the 1-inch ribbed bolts, and tightened the hex nuts by hand with special long-handled wrenches.

At the foot of each pile a hole was dug by hand, a wood form constructed, and concrete encasements poured around the H-beam piling. The encasements are 16 inches square affording a 3-inch cover on the pile and 5 feet deep; 2 feet project out of the ground and the rest of the encasement is 3 feet in the ground.

Flood Delays Work

During January of this year heavy rains caused high water in this section of Alabama, flooding the bottom lands along the creeks. Work was resumed as soon as the waters had dropped, and construction was in progress on all three bridges at the same time.

The piles remaining from the original wooden trestle were yanked out by the crane, or cut off 2 feet below the natural ground line, the old piers and steel trusses having been previously dismantled. Abutments were excavated and the original roadway fill was moved where the new bridge extended beyond the limits of the old structure. Excavation for the piers was done by the Lorain crane with a ⅜-yard Blaw-Knox clamshell bucket and a Hendrix ⅝-yard drag bucket.

The remaining excavation was done with a Caterpillar D7 tractor equipped with a LeTourneau bulldozer and a Wooldridge 8-yard P22 which was towed by an Allis-Chalmers HD-10 tractor. An Adams sheepsfoot roller was used in compacting roadway fill.

The pier columns were completed on top of the 9-foot-square x 2-foot 4-inch footings, and were connected by a concrete web wall 1 foot 3 inches thick and 27 feet high. The bottom of the wall is a foot below the low-water elevation of 160.6. The bottom of the lowest footing is at elevation 148.75. High-water elevation has been at a maximum of 189.1, but the finished grade of the new bridge is at elevation 194.0. The highest pier is 41 feet and measures 2 x 4 feet at the base; it tapers to a 2-foot-square section at the top. The concrete pier caps are 36 feet long, 3 feet wide x 3 feet 3 inches deep. All the exposed concrete was rubbed, first with attachments hooked to the vibrators and then finished by hand.

Spiral Reinforcement

All structural steel was supplied by the Virginia Bridge Co. plant at Birmingham, Ala. Most of the members were delivered to the job by truck. But the larger pieces for the continuous spans of 50-60-50 feet were shipped by rail to Selma, and hauled from there

(*Concluded on next page*)

On the CP Portable Compressor, the gradual speed regulator automatically synchronizes the engine speed to variations in air requirements. Whenever the air demand slackens, the speed is correspondingly reduced.

This and other CP features effect fuel savings of 15% to 35%, and also minimize maintenance costs.

CP gasoline-driven compressors range from 60 to 315 c.f.m.; CP Diesel-driven compressors from 105 to 500 c.f.m. Write for full information.

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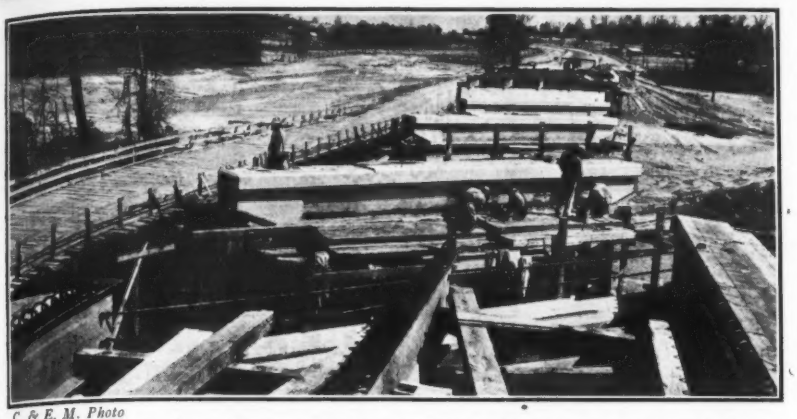

C. & E. M. Photo

Looking south on the main bridge we see finishers rubbing down pier 7, one of the skew piers constructed with two columns connected by a web wall. At the left is the temporary timber detour bridge.

to the bridge by trailer truck. The continuous spans are 30-inch WF 108-pound beams.

Before the stringers over the steel-pile bents were raised to position, the spiral steel reinforcement was first welded to the top flange. The bars used are ⅝ inch in diameter wound into a spiral having a 4-inch outside diameter. Two 5/16-inch fillet welds with an effective length of 1¾ inches were spotted on each side of the spiral bar at every pitch. The pitch of the spiral varies from 5 inches on the ends of spans to 8 inches in the center of spans; it is covered by a patent held by Porete Mfg. Co., of North Arlington, N. J. Welding was done by two Hobart 300-amp welders. The spirals were later encased in the concrete deck and act as a horizontal-shear connection with the concrete.

The continuous beams are cross-braced with 18-inch 42.7-pound channel struts at the one-third points on the 50 foot panels, and at the one-fourth points on the 60-foot panel. The crane erected all the steel, working either from a temporary driven-pile trestle ramp over the creek or from the ground. Two cranes were used for erecting the 30-inch beams.

Finishing Touches

In screeding the 6½-inch concrete deck slabs, the contractor used a heavy 1,000-pound screed 36 feet long, which was pulled lengthwise over the 34-foot spans. The bottom member, a 6-inch channel, was connected to a length of 4-inch boiler tubing on top with turnbuckles which permitted any type of adjustment. Four men at each end were required to handle the steel screed. At every bent a 1-inch open joint was left in the concrete deck.

These open joints were utilized when cleaning and painting the structural steel in the final touches to the bridge contract. A scaffold was constructed under the superstructure by stringing three lengths of ¾-inch guard-rail cable lengthwise of the bridge. One piece of cable went down the center, and the other two under each of the outer stringers. They were supported at each bent by a short length of the same-size cable which passed through the 1-inch slot and was fastened to a ½-inch section of reinforcing rod. The rods were laid out lengthwise of the deck.

As each span was cleaned and painted, a latticework of boards was stretched out over the cables on which the workmen were supported. The cables were easily lowered to the ground and the board framework was moved ahead as each span was completed. The scaffold had a slight sway, but the initial work was done on the land sections of the bridge so that the men could get used to the movement before going out to the spans over the creek, which also were higher in the air.

The steel was delivered with one shop coat of red lead. In the field, two more coats were added after the shop coat had been spot-painted where needed, one of red lead and the other of aluminum paint. Binks spray guns were used in the painting.

Quantities and Personnel

A work force averaging 25 to 30 men was employed under the direction of V. E. Grimes, Superintendent. The project was also closely supervised by the two members of the contracting firm, W. B. Goodwyn and Sam Murphree. The major items in each of the three bridges are listed in the accompanying table.

The Alabama Highway Department was represented on the contract by S. H. Park, Project Engineer, and W. M. Geeslin, Inspector. The project is located in the Third Division of which S. J. Cumming is Division Engineer, with headquarters at Tuscaloosa. The Department is headed by Ward W. McFarland, Highway Director, with Marvin Taylor, Construction Engineer.

Items and Quantities

	Oakmulgee Creek	Childers Creek	Oakmulgee Relief
Bridge excavation, Class I	310 cu. yds.	....	....
Bridge excavation, Class II	350 cu. yds.	....	....
Common excavation	3,550 cu. yds.	450 cu. yds.	3,300 cu. yds.
Concrete	900 cu. yds.	143 cu. yds.	127 cu. yds.
Reinforcing steel	186,000 lbs.	28,000 lbs.	26,600 lbs.
Structural steel	396,000 lbs.	54,400 lbs.	54,000 lbs.
Spiral bars	7,900 lbs.	1,500 lbs.	1,500 lbs.
Steel piling	3,440 lin. ft.	1,040 lin. ft.	880 lin. ft.

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This is a typical example of the kind of service you can expect from Marmon-Herrington *All-Wheel-Drive* Trucks. Live power and traction in all wheels makes them masters of every condition of weather and terrain—seldom is mud too deep, hills too steep, going too rough and rugged.

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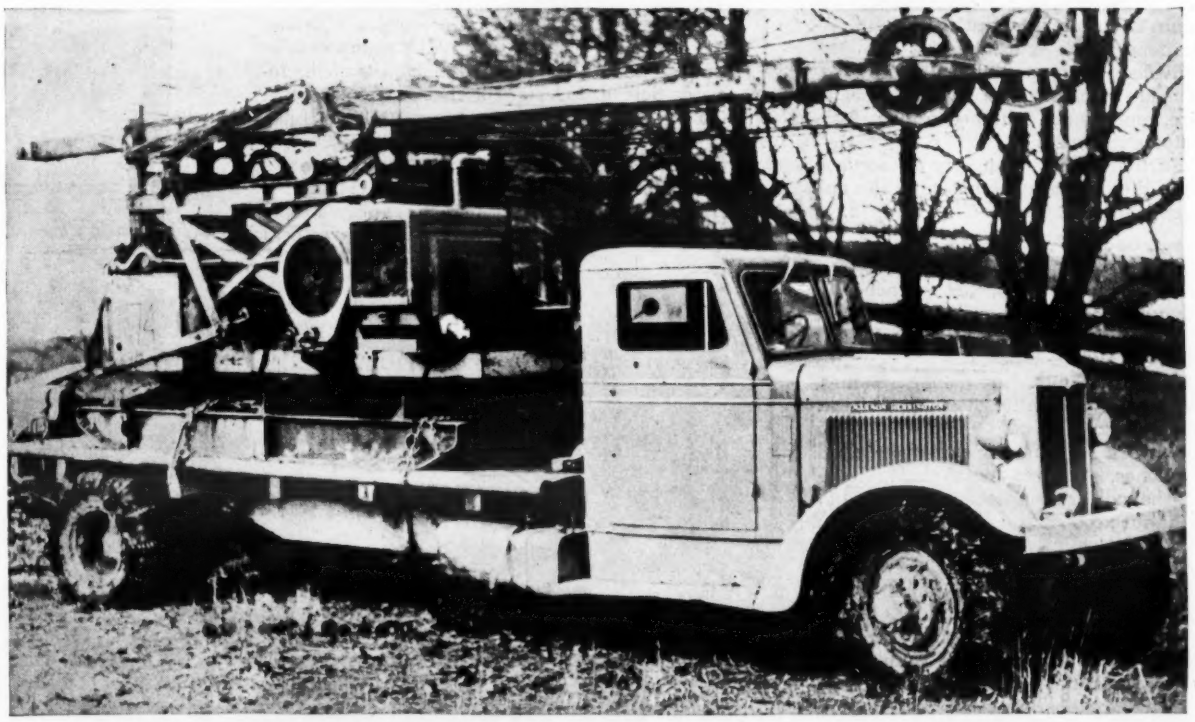
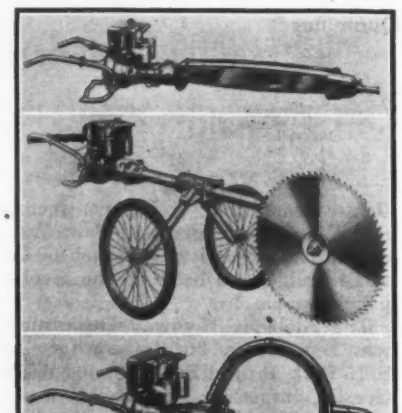


MARMON-HERRINGTON ALL·WHEEL·DRIVE



These three new Mall power saws feature an interchangeable gasoline engine. At top is the Model 7 chain saw which comes in capacities of 18 inches to 12 feet; in the middle is the circular saw which comes in 30 and 36-inch sizes; bottom photo is the bow-chain saw with an 18-inch cutting capacity.

Gasoline-Driven Saws Speed Land Clearing

Three power saws for use in clearing land, felling or limbing trees, and similar purposes have been announced by the Mall Tool Co., 7743 So. Chicago Ave., Chicago 19, Ill. Feature of these saws is a gasoline engine that is interchangeable on all three units.

The Mall Model No. 7 is of the chain-saw type for one or two-man operation. It is equipped with an automatic clutch which keeps the engine running should the chain become pinched or jammed. According to the manufacturer, the cutting chain can be swiveled for cuts at any angle by use of a single lever. Weight of the 24-inch model is 75 pounds. It is made in capacities from 18 inches to 12 feet.

The Models No. 30 and 36 are one-man-operated circular saws, mounted on trailers having two bicycle-type tires. They are made in 30 and 36-inch sizes; the 30-inch blade is said to be able to cut trees up to 22 inches in diameter. An automatic centrifugal clutch permits the engine to idle without the saw blade revolving. The angle of the saw blade can be controlled from the operating handle without touching the saw blade. Weight of the unit is 200 pounds.

The Mall bow-chain saw is designed for one or two-man operation. It is said that the bow design keeps the chain from pinching during cutting operations. The cutting unit can be swiveled for any angle of cut. The saw is made in an 18-inch cutting-capacity size, and comes equipped with a fully automatic clutch.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 12.

Socket-Wrench Kits

A compact set of socket wrenches in a handy tool chest is available from the Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee, Wis. The set contains 49 Nugget double-duty drive wrenches, and weighs slightly over 12 pounds. Blackhawk claims that this set will do the work of many more standard wrenches. The red metal chest is bullet-shaped; is mounted on wheels and skids for scooting on shop floors; has a hinged lid which serves as a receptacle for parts; and has a scoop-type bottom said to facilitate easy wrench withdrawal.

According to the manufacturer, the reduction in the required number of wrenches is made possible through the use of Hexite alloy steel; this is said to permit a 7/16-inch drive having strength equal to the usual ½-inch drive and the compactness of the ⅜-inch drive.

These Nugget wrenches, plus the complete line of open-end and box-type wrenches and related equipment made by Blackhawk, are described in Bulletin No. 247. This catalog covers the complete line, shows all sizes in which each of the items is made, points out construction features, and gives other related data.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 94.

Concrete Plant on Wheels

A catalog describing its post-war Mixermobile has been prepared by Mixermobile Manufacturers, Dept. CE, 6855 No. E. Halsey St., Portland 16, Oreg. It features a double-page spread showing a picture of the unit and listing 28 operating parts of the Mixermobile portable concrete and elevating plant.

The bulletin is full of on-the-job photographs which show the unit being used on dams, foundations, airport runways, overpasses, elevated railroad crossings, bridges, highways, etc.

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Weed Killer Sprayed On Roadside From Jeep

West Virginia Experiments With 2,4-D Applied With Light One-Man Equipment On Shoulders and Mall

+ THE recently developed weed killer popularly known as 2,4-D (dichlorophenoxyacetic acid) is being tried out by the State Road Commission of West Virginia. Experiments have been in progress to see if weeds growing on shoulders, in roadside parks, and in median strips of four-lane highways can be eradicated without harming the grass.

The weed killer is applied with special equipment mounted on a Jeep; only one man is needed for its operation. Satisfactory results have been obtained with 2,4-D both as to weed control and as to economy of application, since the light equipment employed can be operated at low cost.

Tests were conducted during May, 1947, with the 2,4-D applied first by hand sprays and then by the newly designed special equipment. The periods from May to the middle of July, and from September through the autumn, are considered the best times to expect results. During the heat of August, plant growth is dormant and the effect of the weed killer is lessened.

2,4-D Killer

The new product, which is derived in part from coal and petroleum, can be diluted generously and still kill obnoxious weeds. The immunity that grass enjoys is generally attributed to its narrower leaf. One explanatory theory holds that the 2,4-D causes the fibers in the wider-leaf weeds to expand rapidly; this results in their breakdown, after which they wither and die. Thus it follows that the killer works best at a time when the weed plants are in growth.

In these experiments the butyl-ester type of 2,4-D was used for the most part. It was diluted with water to various solution strengths, depending upon the speed of the spraying unit as it passed over the area under treatment. Diesel oil, when used as a solvent, speeds up the action of the weed killer and is more effective than water. But this solution will also kill off grasses. Nevertheless, in certain areas this may be desirable, as around guard rails where no growth at all may be preferred. At such times, a quart of 2,4-D is usually dissolved in 10 gallons of No. 2 diesel fuel oil, yielding enough solution to treat an acre of ground. Where the growth is exceptionally stubborn, 2 or even 3 quarts of the killer may be used with the same amount of carrier solvent.

In the past, the State Road Commission has always taken care of weeds by cutting them down along with the grass, either by hand or power mowers. Around guard rails this is a particularly slow and tedious task; it can be done more quickly and at lower cost, it is felt, with a sprayed-on solution of 2,4-D and diesel oil. Less mowing will also be required on the shoulders and center strips if the weeds only are removed; for grass alone, even if somewhat high, presents a pleasing appearance when unmarred by the presence of weeds.

Special Spraying Equipment

In the tests using water as the carrier, the 2,4-D was sprayed over the ground with special equipment mounted on a Road Commission Jeep. As the standard shoulder width in West Virginia is 4 feet, an 8-foot spray bar is mounted on the side of the Jeep and fastened to the front bumper by a pipe 4 feet high. The spray bar is a ⅜-inch tube fitted with five fan-type spray nozzles on 18-inch centers. When the Jeep is on its way to a job, the bar may be folded back against the body, supported in part by the flat front fender. When in use it extends out from the side at a point 18 inches above the ground. A cable and pulley attached to the pipe stanchion enables the operator to raise or lower the bar to any desired angle if the backslopes of cuts or the side slopes of fills are to be sprayed. In mountainous West Virginia, however, the cover on slopes, no matter what it may be, is left alone, for growth of any kind is encouraged in order to combat erosion.

To prevent wind drift as the solution is applied, or to keep the 2,4-D away from plants when the rig is working close to homes bordering the road, a canvas shield with metal stiffeners is hung from the spray bar. The shield is also 8 feet long, has a wing protection at both ends, and reaches nearly to the ground.

(*Continued on next page*)

M. A. Mendel, West Virginia's Supervisor of Roadside Development, stands beside the Jeep-mounted rig for spraying 2,4-D weed killer along the state's roadsides.

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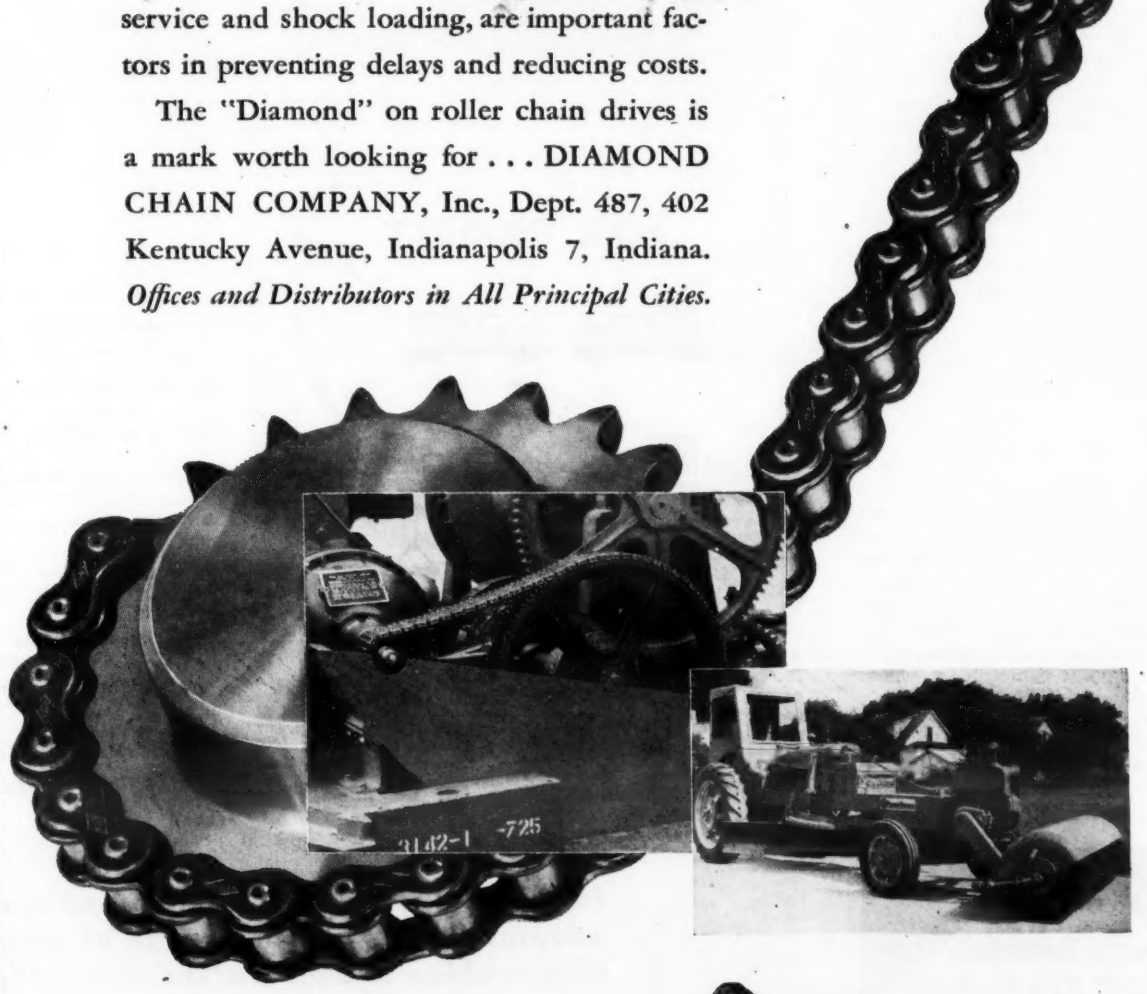

DIAMOND ROLLER CHAINS

Weed Killer Sprayed On Roadside From Jeep

(*Continued from preceding page*)

The spray bar is interchangeable for use on either side of the Jeep. It is also equipped with hinges and springs which raise the bar when an obstruction is met, to prevent any possible damage to the unit. The parts are all of light metal, giving the unit construction that is sturdy yet easy to handle. From the spray bar a 1-inch section of garden hose runs back to the rear of the Jeep where a 55-gallon drum of the solution is stored. During the experiments, a small ¼-hp gas engine powered a pump which sucked the solution from the drum and forced it through the hose and then out the spray bar. For more extensive operations the power take-off on the Jeep can replace the gas engine driving the pump.

Solution Strengths

For every acre of ground that was treated only a quart of the 2,4-D, 40 per cent concentrated solution, was required. This quart was dissolved in 5 gallons of water, furnishing enough solution for a mile of 8-foot shoulder, the approximate equivalent of an acre. When the 55-gallon drum was filled with 2½ gallons of 2,4-D concentrate and water, the Jeep could spray 11 acres of ground without a refill of the drum. This figure was based on the spray bar moving at the rate of 4 miles per hour. At a higher speed, say 10 mph, the same amount of solution but of a higher concentration could cover a much greater mileage of shoulder or center strip. The higher speeds were given only a limited try-out since it was felt that the slower speeds were more conducive to accuracy. The pattern and coverage at 4 mph produced uniform results.

The success of the experiment depended not only on the 2,4-D itself, but on the way it was applied in the intensively fine spray that was pumped through the special nozzles. This cut down the amount of liquid required without affecting its potency. From the experiments in West Virginia, the following table was worked out for the recommended rate of application to be used with the Jeep and its special equipment:

Rate of Travel (mph)	Gallons of Water (to 1 quart of 2,4-D)
2	10
3	6⅔
4	5
6	3⅓
8	2½
10	2

In using solutions of the above strengths, satisfactory results were obtained with most of the common weeds found along the highways. At first the leaves twisted and the color changed from the healthy deep green of the growing plant to a lighter green, and then to white as root destruction set in. In from 10 days to a month the weeds were completely killed.

Some weeds were tougher than others in resisting the 2,4-D and a second application was deemed necessary in places. Another spraying was considered better than increasing the strength of the solution. The common dandelion and plantain types of weed responded quickly to the spraying. Elder, sumac, poke, and blackberry took longer, about 3 weeks, before giving up the ghost. While poison ivy was the hardiest and sometimes required a second treatment.

To prevent wind drift, or when working on roads bordered by homes, West Virginia's weed-killer spray rig is equipped with a canvas shield. The spray bar can be used on either side of the Jeep.

When the growth of the weed plants is vigorous, the 2,4-D is most effective. It will not, however, kill the dormant seed or plants that have not yet emerged from the ground. It is not toxic to the soil.

Low-Cost Eradicator

Costs were kept in this experimental work carried out with a Jeep and special equipment handled by an operator who was paid 95 cents per hour. This one-man rig sprayed an acre of ground or a mile of 8-foot shoulder for less than $3.00. (If narrower shoulders are sprayed, the bar can be shortened by removing a section.) The special equipment cost $125. Both the isopropyl-ester and the butyl-ester types of 2,4-D were used in the experiments, but most of the tests with the Jeep and special equipment were conducted with the butyl ester.

For use around guard rails and places inaccessible to the Jeep-mounted spray bar, a hand spray bar is being devised. For guard-rail work a bar is fitted out with two shorter 21-inch sections, one at the end and the other a foot back

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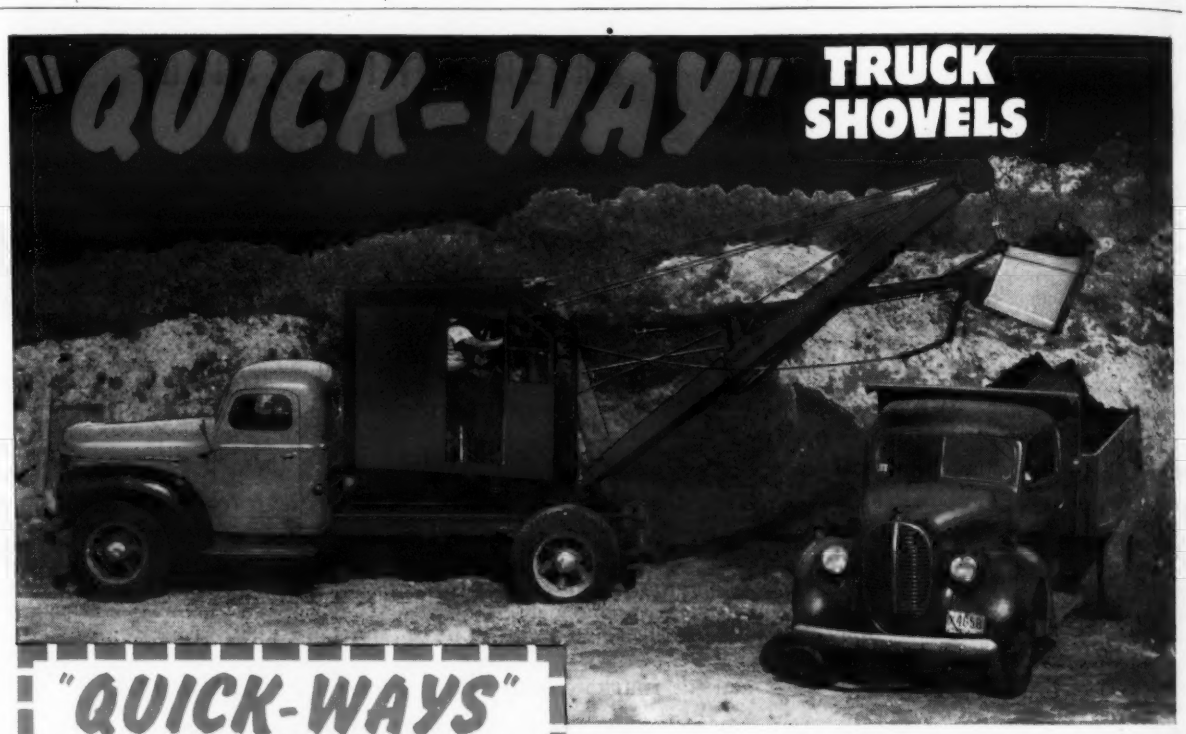
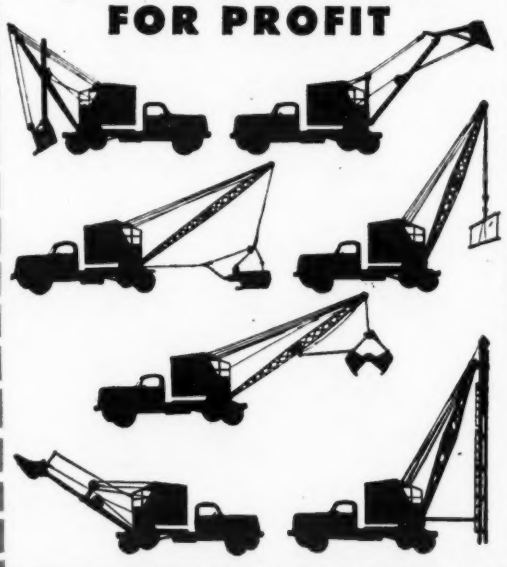


"QUICK-WAYS" FOR PROFIT



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from the end. They are at right angles to the spray bar and have nozzles at the ends. This unit may be pulled along over the guard rail as the nozzles spray the growth beneath. The solution is carried in a 3-gallon knapsack tank equipped with a pressure gage and a shut-off valve.

For inaccessible places the spray bar or boom has a 1-foot section at the end equipped with two nozzles. This will be hooked up to another knapsack tank. Both these units will require only a single operator who will cover on foot the area to be sprayed. The solution will be applied at 25-pound pressure.

The 2,4-D weed killer was furnished by the Sherwin-Williams Co. of Cleveland, Ohio, which also developed the special spraying device known as the Weed-No-More application equipment. The experiments were conducted under the supervision of M. A. Mendel, State Supervisor of Roadside Development of the State Road Commission of West Virginia. The Commission is headed by Ray Cavendish. M. L. O'Neale is Chief Engineer and C. L. Hundley is State Maintenance Engineer.

Bases Are Stabilized For Year-Round Roads

Highway bases in which the ingredients are mixed as carefully as a druggist mixes a prescription were described at the recent meeting of the American Society of Civil Engineers held in Duluth, Minn. George W. Deibler, highway engineer of St. Louis County, Minn., pointed out that chemicals are added to base ingredients periodically in order to obtain uniform high density of sufficient bearing capacity to withstand anticipated loads.

Good results can be obtained by careful selection of the aggregate material, control of the moisture content, and the combination of aggregates with calcium or sodium chloride, he said. Unless the base is to be followed almost immediately by a surface course, he recommends a treatment of one pound of calcium chloride per square yard. Additional surface applications of ¼ pound per square yard are made at least twice during the summer season, about June 15 and August 15.

He stressed the economic advisability of such careful preparation of road bases, including the addition of the chemicals to absorb moisture and to aid the adhering process among the other ingredients. He said it was justified particularly in areas where extremely cold winters prevail, causing load restrictions to be placed on highways during the spring break-up.

He further pointed out that in order to accomplish satisfactory stabilization, the three fundamental factors—gradation, water content, and compaction—must be controlled in their relationship with each other, both independently and combined.

Highway Director for La.

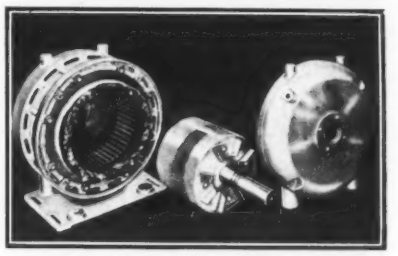
Robert B. (Bob) Richardson has assumed his new duties as Director of Highways for the State of Louisiana. He replaces Col. P. A. Frye, who has returned to his post as Secretary and Executive Officer of the Louisiana Public Service Commission from which he has been on leave of absence.

Richardson, a graduate of Louisiana Tech, has been with the Highway Department since 1921. He has served as instrument man, resident engineer, district engineer, chief construction engineer, and construction and maintenance engineer.

Generator Features Permanent Magnets

An electric generator utilizing permanent magnets is announced by the Kober Electric Co., Arlington, Va. Developed during the war for the Army, it is now in commercial production. The Kober generator is available in outputs ranging from 0.3 to 30 kilowatts. It is made in 60 and 400-cycle types, single or three-phase.

The Kober generator has no exposed electrical connections. It is said to be free of radio interference, to have high efficiency, low weight, and increased compactness. According to the manufacturer, the elimination of exciters, slip rings, commutators, brushes, etc., has reduced maintenance to a minimum.



A Kober 5-kilowatt 60-cycle electric generator is shown here disassembled. It utilizes permanent magnets shielded to avoid loss of magnetism.

Also, it is stated that overloads and short circuits have no affect on the Kober generator.

For applications which require control of terminal voltage, an automatic integrally mounted voltage compensator is available. This unit has no switches, contacts, or moving parts, and is entirely automatic in operation.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.

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Up to 1000 Tons per day
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THE F. D. CUMMER & SON CO.
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NATIONWIDE SERVICE

Construction Problems Studied by AGC Boards

Ways to Expedite Current Program Are Reviewed: Plan for Cooperation With Army Engineers: Highway Bill Urged: 1948 Officers Nominated

✦ PROBLEMS facing contractors, and the best means to meet present conditions, were discussed at the Fall Meeting of the Governing and Advisory Boards of the Associated General Contractors of America, held at Des Moines, Iowa. The main subjects covered were: the means of attaining greater efficiency under current perturbed conditions; means for increasing the volume of construction; how best to operate under the Taft-Hartley Act, and how it affects the construction industry; and a plan for cooperating with the U. S. Army Corps of Engineers to organize and train reserve construction units for emergency military service.

President F. W. Parrott, in his opening statement, said in part: "One of our first duties is to inform the public that it should not believe that there can or will be quick or drastic reductions in construction costs. It is our job as contractors to do all within our power to see that construction is carried out as efficiently, economically, and rapidly as possible."

A discussion of construction costs brought out the fact that highway costs are continuing in a slight upward trend, but that heavy-construction costs in many parts of the country are remaining relatively steady. Principal causes advanced for the continuing upward trend are higher costs for materials, wage increases, and low labor productivity. The amount of construction has also shown an increase. The explanation of this is that owners realize that construction costs are not out of line, and are not likely to decrease drastically.

To Cooperate With Army Engineers

The Boards unanimously adopted a motion to give wholehearted cooperation to a plan for organizing and training construction units for military service under the War Department's program for a "marriage" between the Army and civilian industry. Colonel Robert J. Fleming, Corps of Engineers, U. S. Army, outlined the program by which the AGC and its chapters and branches were officially requested to sponsor and help train at least 100 Army reserve units. These would be ready for immediate mobilization if a national emergency was declared by the President or Congress. The Army is looking to the industry, through the AGC, to give men in the reserve units the necessary construction training; the Army will provide the military training. A benefit of the plan is that men with special qualifications will have appropriate rank and assignment in established regiments in time of an emergency. AGC chapters will work with division and district officers of the Corps of Engineers in the organization and training of the units.

New Highway Bill

Terms of a new highway bill which he intends to introduce were announced by Representative Paul Cunningham, Chairman, Roads Subcommittee, House Public Works Committee. The bill will provide for the authorization of future Federal highway appropriations on a continuing basis. Principal features are: (1) Congress would authorize the expenditure each year for Federal-Aid highways a sum equal to the total receipts from the current Federal excise tax of 1.5 cents per gallon on gasoline; (2) these funds would be allocated on the same percentage basis and by the same formula contained in the Federal Highway Act of 1944, under which the current highway program is operating.

The AGC suggests that a minimum total be stipulated to protect the program against the prospect of a repeal or reduction of the Federal tax. A resolution was adopted that the association support legislation to provide continuing Federal Aid for highways in order that the states may plan and develop long-range highway-construction programs.

Other Reports

Other reports included one by H. E. Foreman, Managing Director of the AGC, who spoke regarding government regulations and controls. He pointed out that "the association has the continuing duty to see that the regulations which do exist permit the industry to operate with the flexibility required. It has the duty to be watchful for new regulations which might hamper its efficiency. It has the opportunity

(*Concluded on next page*)

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Skiff St. Bridge, Hamden, will have two spans of 45 ft, 3 in. Old road (top, right) is to be relocated to cross parkway. Contractor: D. V. Frione & Company, Inc., New Haven, Conn.

Bethlehem Reinforcing Bars in construction of Hall Avenue Bridge, Wallingford. Bridge has two spans of 49 ft, 3 in., and crosses parkway. Contractor: D. Arrigoni, Middletown, Conn.

Bridge construction along Parkway in Connecticut

Named for a former governor, the Wilbur Cross Parkway is to be a vital link in Connecticut's chain of express highways which will ultimately cross the state from a point near Mashapaug, at the Massachusetts-Connecticut line, to New Haven, then turn southwestward to New York's Westchester County.

Some thirty miles in length, the new parkway is already carrying traffic over its western and northern extremities, and is now rapidly taking shape between New Haven and Meriden. In line with Connecticut's policy of grade-crossing elimination, its construction includes the erection of numerous bridges, some of which are shown here. Reinforcing steel for these bridge structures was furnished by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

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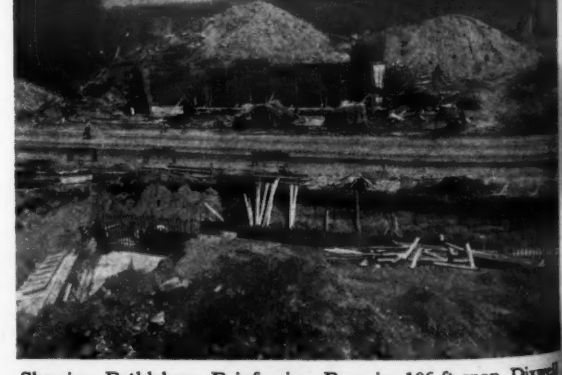
BETHLEHEM STEEL

Baldwin Avenue Bridge, Meriden. Two spans of 48 ft. Here parkway is already in use, but island is yet to be landscaped. Contractor: Arute Brothers, Inc., New Britain, Conn.

Railroad bridge at Wallingford has span of 72 ft, carries parkway over tracks of New York, New Haven and Hartford R. R. Contractor: M. A. Gammino Construction Co., Providence, R. I.



Showing Bethlehem Reinforcing Bars in 106-ft-span Dixwell Ave. Bridge, Hamden. Parkway to cross existing roadway here. Contractor: The Mariani Construction Co., New Haven, Conn.

An enterprising ex-G. I., who lost his taste for fishing and gained considerable knowledge of equipment during three years of Army life, is now one of Alaska's successful road-building contractors. Shown here with his Allis-Chalmers HD-7W tractor with Baker bulldozer, Tim Gologergen operates from his home on St. Lawrence Island near the International Date Line—sometimes today and sometimes tomorrow!

to serve as the vehicle for the industry to discipline itself and to carry out its activities so that regulations are not necessary".

Steps which the Board urges all members to continue include: (1) when customary and to the fullest extent possible, give and demand firm prices; (2) encourage greater productivity and efficiency of workmen, maintenance of wage rates for agreed-upon periods of time, elimination of wasteful practices, settlement of jurisdictional disputes without work stoppages, and training of more apprentices; (3) discourage owners from demanding speed which requires uneconomical operations, and encourage allowance in completion dates for unavoidable delays; (4) co-operation with design professions to conserve scarce materials and to eliminate uneconomical practices and specifications.

Nominations

Dwight W. Winkelman, President, D. W. Winkelman Co., Syracuse, N. Y., was nominated by the Boards for President in 1948, to succeed F. W. Parrott, President, C. F. Lytle Co., Sioux City, Iowa. Adolph Teichert, Jr., President, A. Teichert & Son, Inc., Sacramento, Calif., was nominated as Vice President of the association, to succeed Mr. Winkelman.

Revised Reference Book Covers Structural Design

A simplified textbook of structural-design fundamentals has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Written by Harry Parker, Professor of Architectural Construction at the University of Pennsylvania, it is designed to give simple solutions of everyday structural problems to those with a limited theoretical knowledge of the subject.

"Simplified Engineering for Architects and Builders", second edition, is a complete revision of the early material. It introduces new unit stresses, new tables, new and revised problems, necessitated principally by rapid changes in building-code requirements which have occurred since the first edition was published. Set up in handbook form, it serves as a reference for engineers, architects, constructors, and students requiring access to terms and basic principles employed in the design of structural members in building construction.

It shows how to determine unit stresses, how to draw shear and bending-moment diagrams, and how to determine the reactions in beams. It outlines how to design, using this information, the proper cross-sectional area for timber, steel, or reinforced-concrete members. One section is devoted to the design of roof trusses.

The book is available direct from John Wiley. Price: $3.00.

Asphalt Vitalized To Coat Aggregates

A chemical concentrate said to vitalize all forms of asphalt for wet-coating of aggregates has been developed by West Bank Oil Terminal, Inc., 213 So. Broad St., Philadelphia 7, Pa. According to the producer, when the proper percentage of Rode-Rite chemical is introduced into cut-back asphalt, the asphalt will effectively coat every form of aggregate either wet or dry, hot or cold.

The cut-back asphalt used should be heated to a temperature of between 150 and 180 degrees F for mixing, if the RC-4 type is used. Where RC-2 or RC-3 is used, the temperature may not exceed from 125 to 175 degrees F. Mixing should take at least 3 minutes, although the manufacturer states that satisfactory results can be achieved in less time. It should be applied with a standard asphalt distributor. For best results, the company recommends premixing. This can be accomplished in a pugmill or a continuous screw mixer.

Rode-Rite-treated asphalt is said to be neither corrosive nor toxic to any degree that would be detrimental to the human body. It is sold in tank-car lots or 50-gallon drums.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 4.

Chain Belt Transfers Hill

David B. Hill has been appointed District Field Engineer in the Atlanta office of the Chain Belt Co. of Milwaukee. Previously, Mr. Hill was Application Engineer in the company's Conveyor Division.

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ADC-900	FOR TRUCK SERVICE Maximum Gross Vehicle Weight Rating—35,000 Pounds
ADCR-900	FOR TRACTOR SERVICE Maximum Gross Combination Weight Rating—65,000 Pounds
ADCW-950	FOR TRUCK OR TRACTOR SERVICE Maximum Gross Vehicle Weight Rating—45,000 Pounds Maximum Gross Combination Weight Rating—70,000 Pounds
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Asphalt Plant-Mix Placed Under Water

Mass Loads of 300 Tons Dumped by U. S. Engineers As Revetment Protection For Scouring River Bank

✦ A UNIQUE operation to provide low-cost erosion-resistant blankets on submerged river banks was initiated in March of this year by the U. S. Engineers. Hot asphaltic plant-mix was placed under water in mass quantities from bottom-dump hopper barges containing 300 tons of material. The first location chosen to demonstrate this new method of checking scour was at Reid-Bedford Bend on the right bank of the Mississippi River about 3 miles below the bridge at Vicksburg, Miss.

At this point a serious problem in scour and erosion confronted the U. S. Engineers. Along some stretches of the Mississippi the levees are very close to the edges of the great river which, in its continuous meanderings, attacks and caves in its banks. At Reid-Bedford the main levee had previously been set back, and now the river had already cut its way to the line of the former levee.

To protect this bank, extensive construction had been carried out in October and November, 1946. The upper bank had been given a protective 6-inch pavement of asphalt paving mix (6 per cent asphalt content), while below the water line an articulated concrete mattress had been laid as a subaqueous revetment extending about 300 feet out into the river. The mat is made up of concrete blocks, 48 inches long x 14 inches wide x 3 inches deep, tied together by wire embedded in the concrete.

Despite this heavy-type construction, which ran along the curving bank for 5,500 feet, failures occurred in the underwater structure. In places the swift current caused undermining at the toe of the concrete mat, and this eventually spread upwards even under the upper-bank protection pavement. The undermining resulted in portions of the mat breaking off, since its foundation was swept away. In some locations the mat was lost.

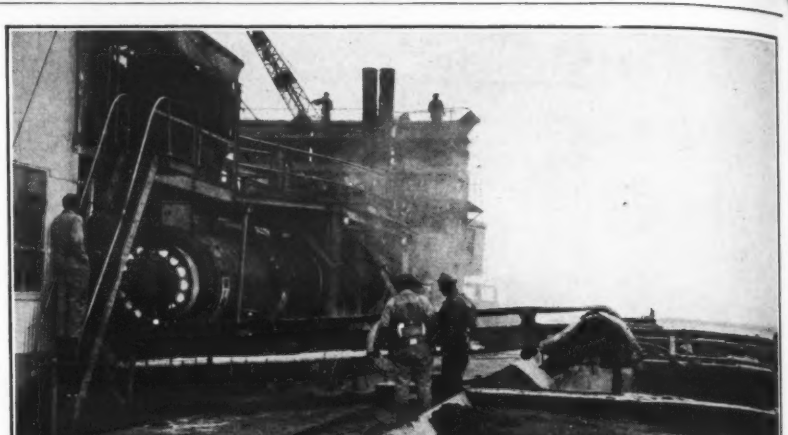
Obviously, replacing the sections of failure with the same type of construction would be ineffective. Yet protection had to be restored to the river bank lest the caving continue through the old levee and threaten the new levee to the rear.

Use of Mass Asphalt

Theories previously accepted held that asphalt mixes should be placed only on dry bases, free from standing water, and under suitable weather conditions. Despite these theories, the Corps of Engineers had conducted some radical experiments with underwater placement of hot-mixes. Satisfactory results were obtained, proving that laws that apply to the construction of asphalt highway pavements do not have to be followed where units placed are great masses.

In July, 1946, for instance, at Avondale near New Orleans, 420 tons of plant-mix was dumped on a bank submerged under 10 to 16 feet of water. The deposition took about 6 hours, using a 2½-ton bottom-dump bucket, while the temperature of the mix at the start was slightly below 350 degrees F. Surveys taken before and after the dumping indicated that the hot-mix had spread at least 20 feet both up and down stream, and had slid down the submerged bank about 100 feet. Core borings later confirmed the findings of the surveys.

The field test indicated that hot asphaltic mixes could be placed under water to form a homogeneous mass. True, certain conditions had to be met. The mix had to be suitably proportioned, high temperatures were necessary, and a method of dumping the asphalt mix en masse in large units had to be devised. With a mix having a specific gravity of nearly 2, the material would spread itself over the bank by the force of gravity. Its great heat of 350 degrees F or over would repel water which vaporizes at 212 degrees F. Thus the material would fill up the holes in the underwater revetment, and congeal along the bottom of the bank, forming a blanket cover which the superposed water would compact.



C. & E. M. Photo

Here some 260 tons of hot-mix for river-bank protection are discharged from the plant at a temperature of 375 degrees F. A 35-foot x 30-inch belt conveys it into a bottom-dump hopper barge 114 x 26 x 8 feet deep.

Full-scale operations for practical application of the principle disclosed by the experiments were initiated in March and carried on until July, 1947, at three bends: Reid-Bedford near Vicksburg;

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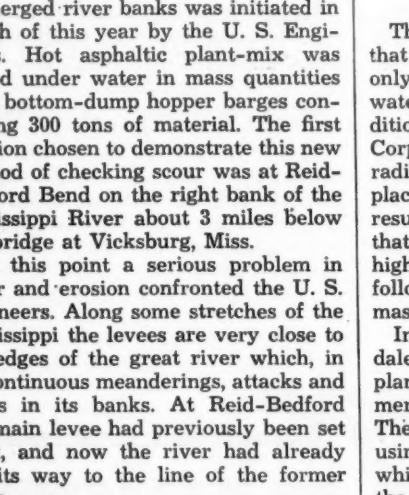

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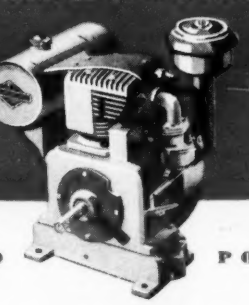

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Hardscrabble near St. Joseph, La.; and Kempe near Waterproof, La. At Reid-Bedford, about 31,000 tons of hot asphalt mix was dumped along sections of the submerged bank 500 and 1,000 feet long, extending out into the river from 300 to 500 feet to protect areas where revetment failures had been disclosed and bank caving was active. At Hardscrabble, about 45,000 tons was dumped to reinforce the outer 100 feet of the articulated concrete revetment and to blanket areas where surveys disclosed failures. At Kempe, about 74,000 tons was placed to blanket the submerged bank over an area about 3,200 feet long extending out into the river about 350 feet. In all, about 150,000 tons of plant-mix (sand-asphalt) were placed on the submerged bed and bank of the Mississippi River.

The work was done entirely by U. S. E. D. forces. Bar-run sand taken from the river was used for aggregate, and it was mixed with asphalt on the U. S. Engineers' large floating hot-mix plant. Bottom-dump mud scows conveyed the material to the site where it was dumped in a matter of seconds. The entire operation was developed to produce a low-cost mix. Only the asphalt cement was purchased, since the aggregate was obtained from the river, while the mass dumping by gravity eliminated the need for a lot of equipment and man-power.

Sand and Asphalt

On the Reid-Bedford project the sand was taken from a bar lying off the left bank of the river immediately across from where the hot-mix was being dumped. Its presence there is in keeping with the character of a silt-bearing river like the Mississippi. Sand bars usually pile up on one side while the fast-moving current attacks the opposite bank and eats it away. The good-quality sand was excavated by a steel derrick barge, 85 feet long x 30 feet wide and drawing 4 feet of water. At the bow end the barge carried a Bucyrus-Erie Model 54-B crawler crane, with a 70-foot boom and a Blaw-Knox general-purpose 1½-yard clamshell bucket equipped with teeth.

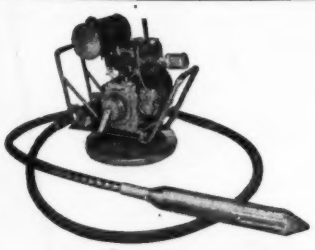
Slightly aft of amidships on each side of the barge is a 19-inch-square steel spud, 40 feet long, by means of which the barge either moves along over a bar or anchors itself for working. This obviates the use of long lines to anchors in the river. The other principal piece of equipment on the barge is a Sauerman 7-drum hoist, but only four drums were used consistently. Two of these controlled the movements of the spuds, while two other lines were strung out to the sand barges to maneuver them alongside for loading. In this location the barge worked downstream, digging sand from below 10 to 14 feet of water. Shallow water was always sought as it made for more economical digging.

The sand was loaded to six barges, 195 x 35 x 9 feet 9 inches deep. These were formerly used for shipping oil but had since been converted to a flush-deck type of barge. Each held an aver-

(*Continued on next page*)

C. & E. M. Photos

Ranges set up on the Mississippi River bank (left) and instruments register the resistance in ohms detected on the thermal-coupling system, showing the presence of the asphalt by the change in water temperature. At right, this pontoon line extending out at right angles from the bank was part of the control system for dumping hot-mix at Reid-Bedford Bend.



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It's been a real time and cost saver, and our Oliver "Cletrac" dealer really rang the bell when he said it would be a "handy man" for our work. He happened to be out one day when we were digging a foundation and remarked about the amount of heavy equipment we had. "You know," he said, "we've got a little unit that might save you a lot of time and money. It's a small hydraulic bulldozer that mounts on the Oliver HG . . . the smallest track tractor in the field. We call it the 'Imp.' It's small enough to do a lot of those jobs without the higher operating costs of a big tractor-dozer unit. And you can get it into places where the big tractors can't operate so you can eliminate a lot of hand labor."

It sounds good to me and it's proved even better. That Oliver "Cletrac" dealer sure has a lot of ideas that make a job easier. He's a good man to know.

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Industrial Division: 19300 Euclid Ave. · Cleveland 17, Ohio

Asphalt Plant-Mix Placed Under Water

(*Continued from preceding page*)

age of 1,000 tons of sand which was heaped up high on the deck. Two other barges, each measuring 120 x 30 x 7 feet deep and having a capacity of 350 tons, were also used for carrying sand. The loaded barges were towed by an 85-foot tug with a 24-foot beam, drawing 9½ feet of water, and powered by a 650-hp diesel engine. The average length of tow was a mile to the floating asphalt plant which was located off the left bank of the river about 2 miles below the Vicksburg bridge.

Asphalt used in the mix showed a penetration of 85 to 100. It was purchased from the Pan-American Petroleum Co. at Destrehan, La., just above New Orleans, or from the Standard Oil Co. of Louisiana at Baton Rouge, La. Altogether seven barges were used to handle the asphalt, each measuring 120 x 30 x 7 feet and with a capacity of 400 tons. One of these was kept at the plant to supply the pugmill while the other six were used for transport. As soon as three barges were emptied, they were towed down the river for more asphalt, while the other three were being unloaded. When the three full barges returned, the other three, now empty, were ready for a trip to the refinery. The same type of tug used in towing the sand barges towed the asphalt-laden craft.

All the asphalt was pumped into the one barge permanently located at the floating plant. The main boiler at the plant supplied steam to this barge, keeping the asphalt at a temperature of from 300 to 350 degrees F. Each barge was equipped with an asphalt pump.

Floating Asphalt Plant

The floating plant of the U. S. Engineers is one of the cleanest and best-maintained asphalt plants either afloat or ashore. The set-up includes five main barges whose location is fixed for the duration of the job in hand. Two of these barges at the upstream end of the plant are lashed together perpendicular to the bank and touching the shore line. From the outer corner of the upper barge, which is used as a shop and for storage, a 750-foot cable runs out to a deadman buried in the bank; this keeps the plant from drifting downstream with the current. The adjoining barge holds supplies for the work. The other three barges are lashed together end to end parallel to the bank, being fastened to the downstream side of the supply barge from the end farthest out in the water.

The lay-out resembles a reversed letter L. From the lower end of the barge farthest downstream, two anchor lines run out at 45-degree angles with the center line of the 3-barge string. One line, 500 feet long, is secured to a sea anchor in the river, while on the opposite side a 250-foot line is moored to a deadman on shore. These fastenings eliminate lateral movement in the floating plant.

The upstream barge of those parallel to the bank is the asphalt supply barge in which the asphalt cement is stored to serve the mixing plant.

Sand barges are tied up on either side of the downstream barge which measures 120 x 30 x 7 feet deep. In the hold of this barge is a storage tank containing 1,000 barrels of bunker C fuel oil for the main boiler and the driers; it also contains tanks of water for the boiler. Two 3,000-barrel oil barges keep the fuel tank supplied with Standard of Louisiana oil from the Baton Rouge refinery. On the deck of the barge is a pier-mounted Industrial Brownhoist electric crane hoist with a 50-foot boom and a Williams 1-yard clean-up-type clamshell bucket. Power for the crane is generated on the mixer barge. The sand is unloaded from the material barges by the crane and dumped into three bins, each holding 15 tons, located on the center barge of the three in line.

The center unit, a steel barge 120 x 38 x 7 feet deep, is the mixer barge. As it was assembled by combining equipment which various manufacturers furnished, according to low bids for its component parts, it cannot be designated as any one particular type.

From the three bins located at the lower end of the barge, the sand is discharged onto three circular table feeders, 5 feet in diameter, which turn at the rate of 7 rpm. By means of a knife blade crossing the feeder from the side, the amount of material going to the driers can be adjusted. From the feeders the sand flows into three Ruggles-Coles driers, placed side by side on the deck of the barge. The two outside driers are 35 feet long x 70 inches in diameter, while the center drier is 48 feet long and has a 90-inch diameter.

The plant was designed originally to handle asphalt mix requiring the use of filler material. Loess, a common type of soil in this section of the Mississippi Valley, was used for filler. In order to heat it indirectly, a big drier with a double shell was necessary. Later the use of a high-type mix was discarded for a simple blend of sand and asphalt, so the special drier was converted to heat sand with direct heat as it passed through. Each drier is heated by a Ray oil burner at the upstream or discharge end of the cylinders. Dust fines are collected by an American Air Filter dynamic precipitator, while the fumes are drawn off through 20-foot stacks, one on each drier.

From the driers the heated sand is raised within two enclosed hot eleva-

(*Continued on next page*)

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tors of the bucket type, 45 feet high, each having a capacity of 80 tons per hour. The outside driers feed into the elevator on its side of the plant, while the middle drier can feed into either or both of the elevators. Thus if one elevator is down for repairs, the plant can still function on the other. Both elevators discharge the hot aggregate into a 22-ton storage bin. No screens are used here, as the sand is of uniform quality, and any sticks or driftwood were removed by a screen on the raw-material bin which had openings 2 x 4 inches. Beneath the storage bin are two weigh hoppers for the sand and asphalt, each equipped with a Fairbanks dial scale.

The Batch

The sand falls by gravity into its hopper, but the asphalt is pumped from the supply barge to the asphalt hopper through a 5-inch steam-jacketed line. This line makes a continuous loop from the barge to the plant so that the hot asphalt is in constant circulation. The upper part of the plant is Hetherington-Berner design, but the 3½-ton pugmill is a Warren Bros. model. Actually only 2-ton batches were mixed on the work. Mixes were varied to suit aggregates with asphalt content ranging between 10 and 16 per cent, to produce a flowing mix at 380 degrees F plus or minus 25 degrees, easy to discharge from hopper-bottom barges. Batches were mixed 45 seconds in the pugmill, and the plant averaged 120 tons of hot-mix per hour.

In a large deck housing at the other end of the barge is the engine room. Here is located a Hedges-Walsh-Weidner 400-hp water-tube oil-burning boiler which operates at 250-psi steam pressure. Two Ray steam turbines and oil burners fire the boiler which consumes an average of 120 barrels of oil per day working two 10-hour shifts. Steam from the boiler drives a combination Moore and Westinghouse turbogenerator set at 500 kw with a 230-volt dc line. The exhaust steam from the turbine goes to a surface-type condenser and the water is returned to the boiler. The boiler also supplies steam to heat the bitumen in the supply barge, and to circulate in the jacketed asphalt feed lines, as well as to operate the gates on the pugmill.

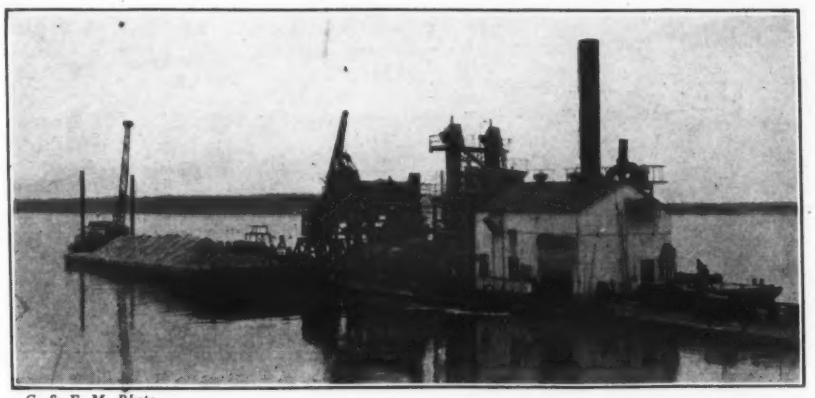
The turbogenerator set runs several G-E electric motors of various sizes and with different functions to perform. All are operated by remote control from the engine-room switchboard. Two 12½-hp units run small winches. Each of the three table feeders is driven by a 1-hp motor. The center drier requires a 60-hp while the outside driers each require a 25-hp motor. Each of the three fans on the driers is operated off a 20-hp unit. The induced-draft fan on the boiler takes a 15-hp motor, and the two elevators each require a 7½-hp motor. The largest of all, a 100-hp model, turns the pugmill.

From the pugmill the hot-mix is discharged into a 5-ton receiving hopper with a feeder at the bottom to regulate the flow of material onto the loading conveyor belt. The belt, 35 feet long x 30 inches wide, projects over the river side of the mixing barge and is driven by a 5-hp motor. A 15-hp unit operates the feeder beneath the pugmill and hopper.

The availability of the floating asphalt plant was essential to carrying out full-scale operations. But its use limited production to the capacity of the plant, and use of a conveyor belt in the discharge assembly precluded placement at temperatures greater than 400 degrees F. On future operations presumably, several mixer units will be used and discharge assemblies will be modified so that more hot-mix can be produced for placement at 450 degrees F plus or minus 25 degrees.

Bottom-Dump Transport Scows

Three bottom-dump mud scows or barges were used to transport the hot-mix from the plant to the bank-failure location. These barges are 114 x 26 x 8 feet deep, and are divided into two hoppers each having a capacity of 200 tons. The barges were not filled to capacity, however, for a 3-foot layer of sand weighing about 50 tons was first spread over the bottom. This was done because the hopper gates opened in about 20 inches of water; if the mix were dumped directly on the bottom, the lower layer would freeze and plug the gates so that they could not be opened. The gates will be redesigned later to clear them from the water so that a cushion of only 10 tons of sand will be needed. Then 40 more tons of hot-mix can be added. The average load carried in the barge was 300 tons.



C. & E. M. Photo

On the crane barge at the left of the U. S. Engineers' floating asphalt plant, an Industrial Brownhoist crane loads sand from a materials barge to the asphalt plant on the middle barge. On the right is the barge containing the hot asphalt.

The hoppers were evenly filled from the conveyor belt by sliding the scows along the side of the mixer barge by means of rope lines. From 2½ to 3 hours were consumed in loading a scow, and another ½ to ¾ hour was consumed in towing it to the place of dump. Actually the scows were not towed. They were pushed either by the tugs used in towing the sand or asphalt barges, or by another unit of the fleet, a larger 100-foot tug driven by a 1,050-hp diesel engine.

On an average, six scows were filled and dumped at Reid-Bedford in the course of the 20-hour working day, divided into the 10-hour shifts. Just over 100 scow loads were dumped at

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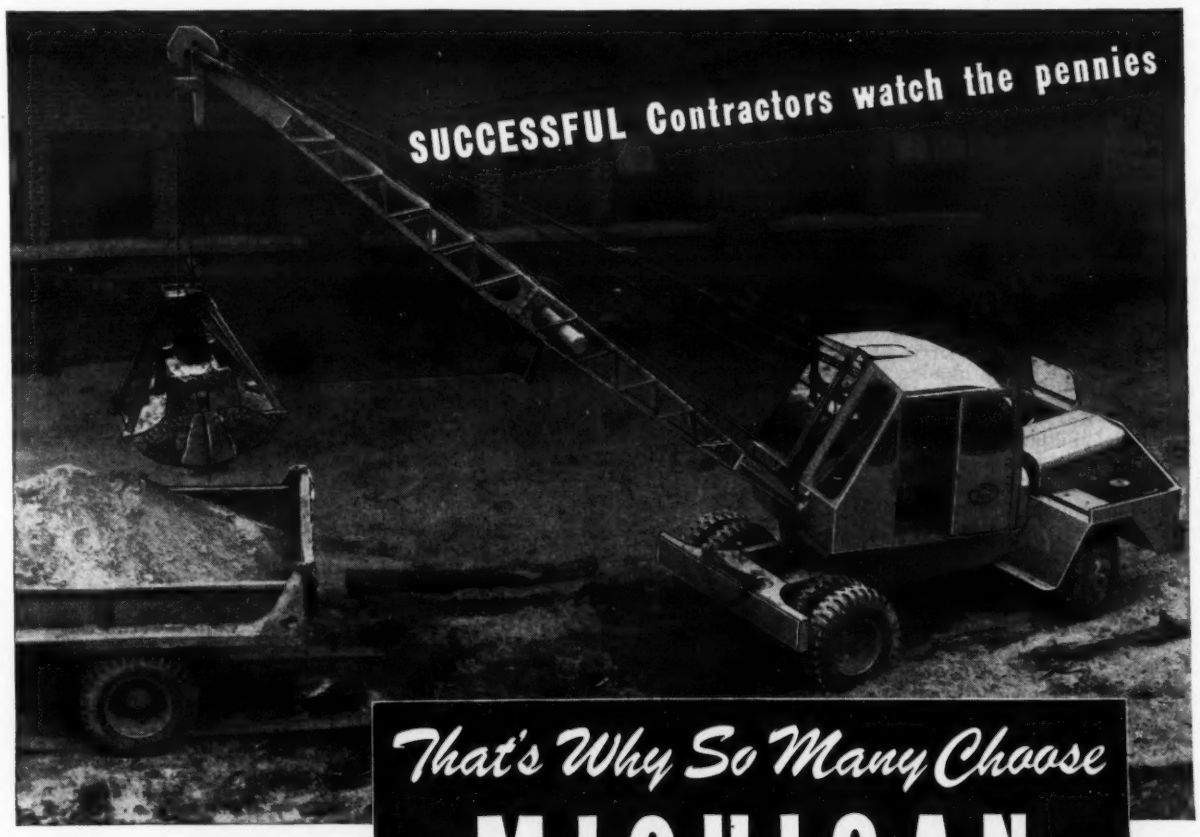

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Asphalt Plant-Mix Placed Under Water

(*Continued from preceding page*)

this location to fill in the caved sections and place a blanket of asphalt over the failed revetment. Because of the large mass of material and the protective crust which formed on top, little heat loss was noticed between the time the mix was delivered to the scows and when it was dumped.

Placement Control

For pioneer operations at Reid-Bedford, various methods were used to indicate the behavior of the material under the muddy waters of the Mississippi, including sounding, boring, survey by diver, and pyrometer observations. It was indicated that a scow load (300 tons) of filled sand asphalt mix dumped at about 350 degrees F would slump and spread to cover about 6,000 square feet of the sloping subaqueous bank. Later, hydrographic surveys and core borings will be run to determine the extent of spread of various mixes and temperatures.

Operations and Personnel

Mass placement of hot asphalt mix carried out in the spring of this year revealed conclusively that river-run aggregate which is dried and combined with asphalt cement at suitable temperatures—preferably a good deal in excess of 400 degrees F—may be dumped in great masses into water to congeal on the submerged bank, even though high current velocities obtain.

On completion of the work, the asphalt plant was returned to New Orleans for rehabilitation which had been deferred during the war. New dump scows of greater capacity and a plant with two or more mixing units will help improve operational practices. They will also reduce production costs and permit placement of durable erosion-resistant blankets on submerged banks subject to scouring attack.

The 1947 work was carried out under the general supervision of the Mississippi River Commission with Major General Robert W. Crawford as President of the Commission. The Reid-Bedford work is in the Vicksburg Engineer District, Colonel Robert G. Lovett, District Engineer. The Hardscrabble and Kempe operations are in the New Orleans Dstrict, Colonel John R. Hardin, District Engineer. L. Brownlee was Field Engineer in charge of the work. General Crawford was represented in the field by R. M. McCrone.

C. & E. M. Photo

From the downstream side of the Mississippi River bank at Reid-Bedford, we see a hopper barge just after the levers have been pulled opening up the bottom gates to discharge a load of hot-mix.

Pillow Blocks, Cartridges, Other Anti-Friction Units

Pillow blocks, flange cartridges, and cylindrical cartridges are the subjects of an 8-page catalog prepared by The Fafnir Bearing Co., New Britain, Conn. Construction of these units permits the use of sealed ball bearings with wide inner rings. The units described in the LAK folder are those used for carrying light or normal loads.

The anti-friction units covered in this announcement are the single pillow blocks Type LAK and the flange cartridges Type LCJ. Photographs, sectional drawings, specifications, and load ratings are included as a guide to purchasers and users. Two pages of the catalog are devoted to telling the story of the Fafnir wide-inner-ring ball bearing which features a self-locking collar. Tables provide complete figures on unit numbers and dimensions, as well as replacement-bearing numbers and load ratings.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 80.

Diesel-Engine Oil

A new oil for automotive diesel engines and for gasoline engines operating in extra-heavy-duty service has been developed by the Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa. It is said to combine the advantages of full detergency and tough film qualities of a paraffin base.

According to the manufacturer, Gulflube H.D. motor oil forms a strong oil film, due to the paraffin base, which functions to provide lubrication under the severest operating conditions. The detergent characteristic of the oil is said to assure cleaner engines and avoidance of high-temperature sludge, piston varnish, lacquer, and stuck rings. This oil also incorporates the Gulf-patented anti-foam agent. Other features advanced for it are low pour point and high viscosity index. It is said to be entirely non-corrosive.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 91.

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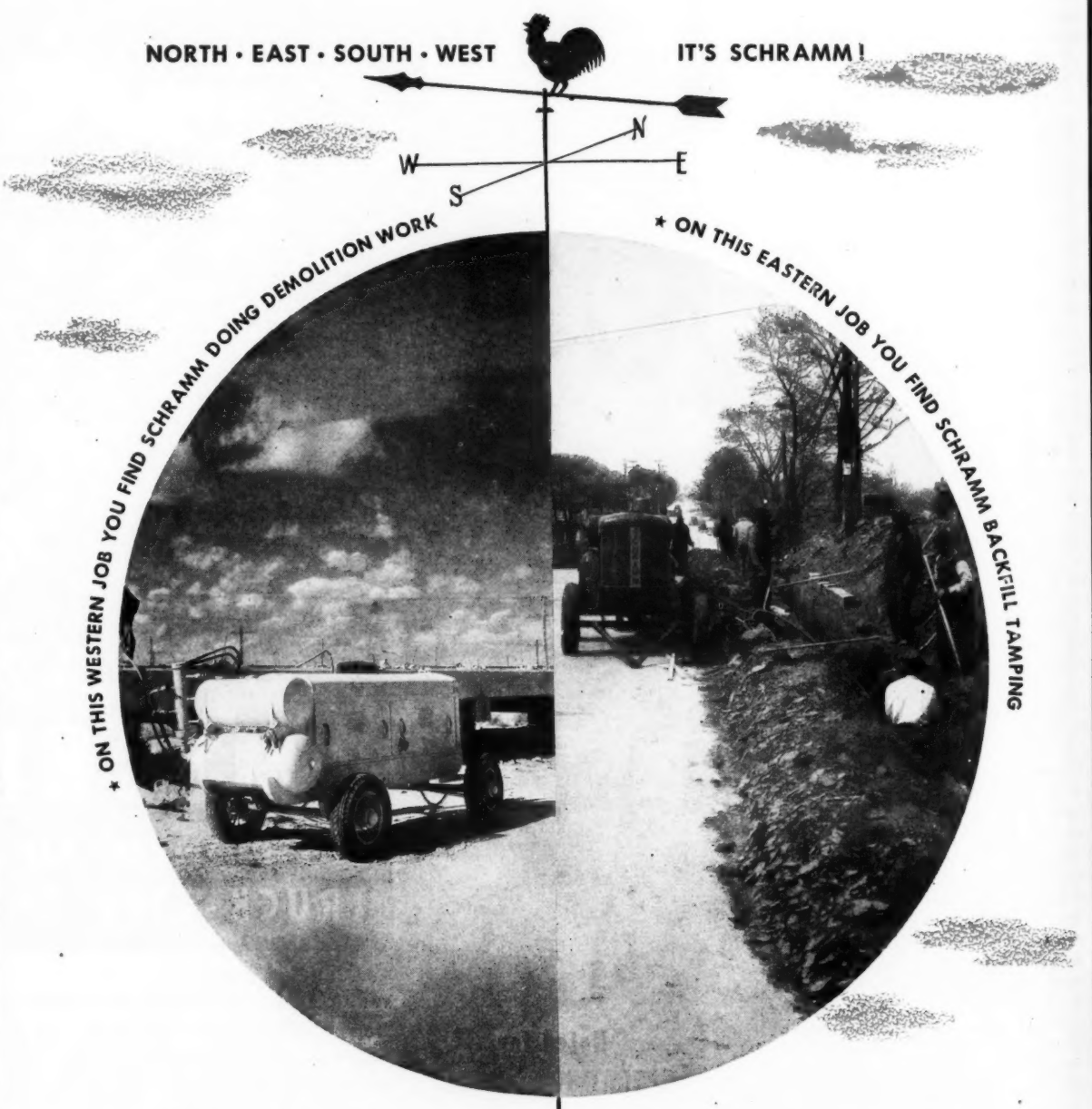

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A Keystone drill rig drives wells to relieve underground water pressure threatening a dam under construction.

Drilled Wells Relieve Water-Pressure Threat

Subterranean Water Pressures Affecting Dams and Other Structures Can Be Eliminated by Means of Curtain of Wells

THE problem of dealing with subterranean water pressure which threatens surface structures such as dams, airports, and buildings, has long baffled engineers. It has recently been solved by drilling a curtain of wells between the source of the water seepage, or pressure, and the endangered installation. The water collects in the wells and is then pumped off. The operation is generally what drillers call a "pipe-driving" job; it involves lowering a pipe from 6 to 30 inches in diameter into an alluvial formation, to a comparatively shallow depth.

When the well has been sunk to the required depth, a tube with a screen of brass or wood is lowered to the water-bearing strata. The outer casing can then be withdrawn. Slitted-iron pipe can, of course, be used for screening, but in some locations it has a short life as the result of corrosion.

If the wells are driven in sand, it is usually necessary to insert a quantity of gravel to prevent the infiltration of sand through the ports of the screen.

It is well known that a large eastern airport is being threatened by pressure from the adjacent sound. In this case, pile drivers have been used successfully to install a curtain of these water-collection wells. Similar operations, using well drills, have been carried on by the U. S. Army Corps of Engineers at Sardis Dam in Mississippi, 60 miles south of Memphis, and at the Fort Peck Dam in northeastern Montana.

Job in Maine

Some elements of novelty are present in the operation of the Layne-New York Co. at a dam site in central Maine where a Keystone Model 50 truck-mounted unit, with reinforced derrick, is being used. The contractor reports it this way:

"They are constructing a power dam. A part of the dam is a natural dam and extends over to the river. The river bottom is all rock, but under the natural dam there are strata of sand. These wells are to drain or take the pressure out from under the natural dam to avoid sand boils. We are driving nine relief wells on the lower side of this dam, and the wells are made by driving 24-inch casing down to a depth of an average of 60 feet. The 6-inch Everdur screen is set through the sand formation, using a 6-inch Everdur pipe above the screen which extends to the surface of the ground. These wells are connected to a large sewer line leading to the river below the dam. All casings in the wells are pulled out, except the 6-inch inner well, and a gravel wall is placed around the inner 6-inch well as the casing is pulled out. We are now moving to the last location and this job is practically finished."

In work of this sort the drilling tools —which consist of bit, stem and rope socket, with a set of clamps affixed to the rope-socket squares, all weighing approximately 4,000 pounds—are used as hammers to sink the preliminary pipe or casing. The sand is exhausted from the tubing by use of a vacuum sand pump, or bailer. When such installations are used in gravel or boulders, the lower end of the drive pipe is equipped with a cutting shoe.

New LeTourneau Executive

L. A. Welch has been named Executive Vice President for R. G. LeTourneau, Inc. He will augment the direction of the present officers, and assist in coordinating the functions of the division managers in LeTourneau factories.

Flink SELF FEEDING SPREADER

- Spreads all materials to 1"
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Details and Prices obtainable from dealers or direct from

YAUN DRAGLINE BUCKETS AND MFG. PLANT
BATON ROUGE, LA.

The Olson Roto-Beater is essentially a tractor-powered rotating cylinder from which extend 102 solid-rubber flails, each about 15 inches long. These beat down and disintegrate weeds so that they go back into the ground as a mulch.

Highway Weeds Cut By Rotating Flails

A machine for right-of-way weed control has been developed by the Olson Mfg. Co., 4000 Warm Springs Ave., Boise, Idaho. The Roto-Beater cuts weeds by the high-speed rotation of 102 solid-rubber flails, about 15 inches long. It is mounted on a 2-wheel rubber-tired trailer designed to be pulled by a tractor.

According to the manufacturer, the weeds are not only cut down but also "chewed up"; they then return to the ground as mulch. Also, stones, wire, and other debris lying on the ground do not affect the unit's efficiency, it is claimed. The Roto-Beater operates at 700 rpm through power obtained from a take-off on the tractor. Approximate weight of the unit is 1,400 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 3.

Heil Co. Promotes Simons

William E. Simons has been promoted to General Manager to coordinate three divisions of The Heil Co. under one central authority. These divisions are the Truck Body & Hoist, Road Machinery, and the Service Divisions. He will continue to hold his former position as Sales Manager for the Truck Body & Hoist Division. Dan Pierce is Sales Manager for the Road Machinery Division, and Charles B. Tamm will continue as Manager of the Field Service Department.

New Blended Asphalt For Seal-Coat Work

Two grades of hot-application bituminous materials for use as seal coats are produced by the Highway Co., Zionsville, Ind. Both products are blends of a high-grade vacuum or steam-refined petroleum asphaltic flux and native Trinidad Lake asphalt. The manufacturer states that no curing period is needed with these hot-application materials.

Liquid asphalt LC is a blended Trinidad Lake asphalt of heavy consistency; liquid asphalt LD is of an extra-heavy consistency. The LC is recommended by the manufacturer when the work is to be done during the cooler periods of early spring or late autumn or when the old surface is in particular need of enlivening; the LD is normally used during the hot part of the paving season. The covering aggregates are applied directly behind the asphalt distributor. They may then be set by light rolling—a desirable but not an essential procedure, says the manufacturer.

One feature claimed for the blended Trinidad asphalts is their content of impalpably fine mineral matter. It is said to be effective in combating the penetration of the active rays of sunlight which slow down hardening and embrittlement. It is further stated that the mineral matter has a fortifying and stabilizing effect on the asphaltic film and contributes to relative freedom from bleeding.

Other advantages said to result from blending Trinidad with petroleum asphalts are: high viscosity index; an increase in adhesive properties towards aggregates; a reduction in stripping tendencies in the presence of water; high resistance to oxidation, and, therefore, deterioration; and no shrinkage of the film due to evaporation of volatile constituents.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

Welding Is Salvage Aid

An 8-page technical bulletin which describes the use of welding equipment for salvage purposes has just been issued by the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. It covers specific procedures involved in equipment-salvage welding with various gas and arc rods for producing hard overlay at low temperatures.

New alloys for the overlay process are featured analytically by means of charts, data, and photographic illustrations of the case-history type. Copies of the "Eutectic Welder: Overlay Issue" can serve as a handy reference for those interested in the economics of repairing worn equipment, and in solving problems of abrasion, impact, cutting wear, corrosion, and friction.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 90.

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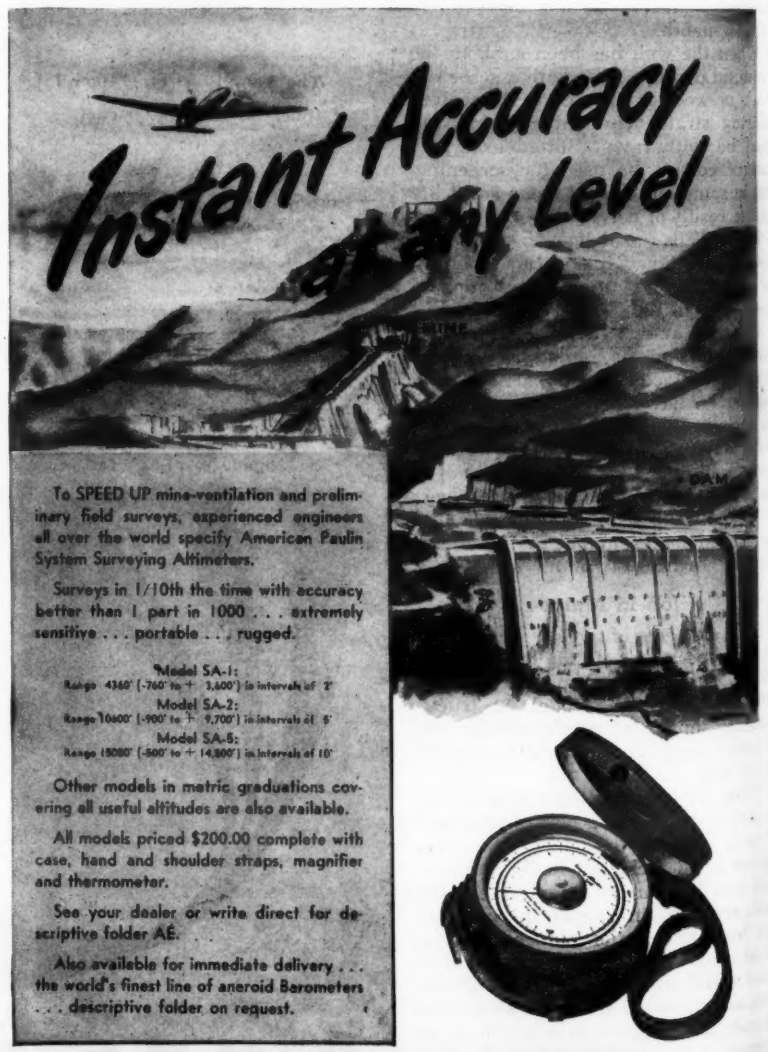

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See Our Advertisement in *The Saturday Evening Post*—November 29th

★ 26 Years of "Better Tools For Better Work"

Mall REG. U.S. PAT. OFF. PORTABLE POWER TOOLS

Aggregate Production, Batching for Runway

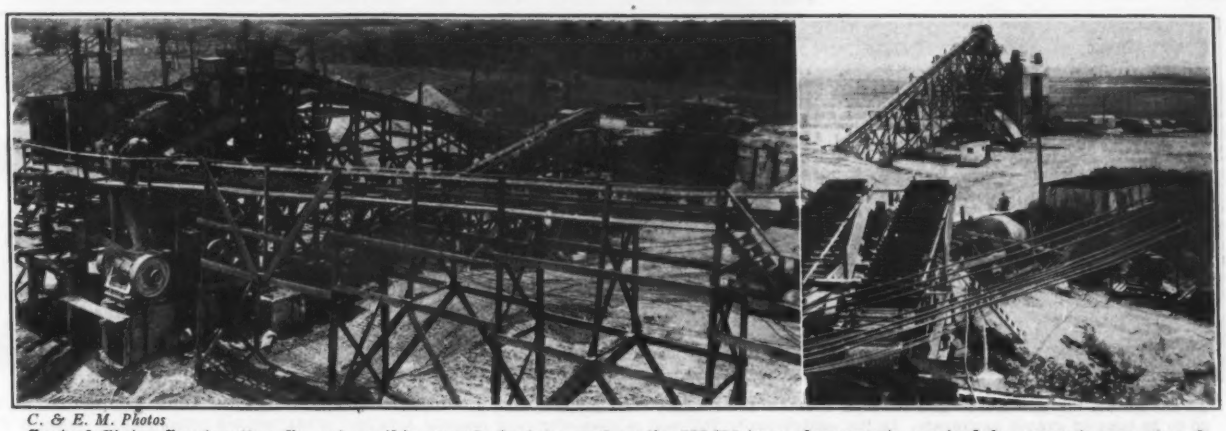
(*Continued from page 1*)

paving started, the plant had produced and stockpiled 80,000 tons of material ready for use.

Aggregate Plant

The gravel is taken wet from the "pit", which is a pond formed by ground and rain water. Working along the banks a Lima 1201 crane, with a 60-foot boom and a Hendrix 4½-yard dragline bucket, excavates the material and loads it into three Heil 13.6 to 18.5-yard bottom-dump wagons. A lot of the water drains back into the pit through the perforations in the drag bucket as the material is lifted, and more is drained out through the bottom-dump wagons on the average haul of 1,000 feet to the plant. This double drainage eliminates rehandling the material to get rid of the bulk of the water. About four bucketfuls load the wagons with from 20 to 25 tons of material.

At the plant the gravel is dumped over a grizzly or grating made of inverted T-rail sections laid on 8-inch centers with a 100-ton sump beneath. From there a Lippmann reciprocating feeder moves the material to a 150-foot x 36-inch conveyor belt. This carries it up a grade to a Lippmann 4-deck 5 x 14-foot vibrating screen. Washing is also done at this point with water pumped from the pit by a Fairbanks, Morse & Co. 10-inch pump driven by a 150-hp electric motor. The four screens are respectively 4-inch, 1½-inch, ¾-inch, and No. 4. Oversized material falls into a Diamond 15 x 36 jaw crusher and is then returned to the main belt on a 100-foot x 20-inch conveyor traveling in the reverse direction.



C. & E. M. Photos

Central States Construction Co. set up this gravel plant to produce the 535,610 tons of aggregate required for concrete runway and taxiway paving at Patterson Field. At the extreme right of the first photo is the receiving hopper and feeder; at the left is the Diamond 15 x 36-inch jaw crusher. The second photo shows the two Lippmann 5 x 34-foot sand drags and the Hardinge ball mill which is charged with 10 tons of 1¼-inch steel balls. In the background is the concrete batch plant.

The gravel passing the 4-inch but retained on the 1½-inch screen goes up an 80-foot x 24-inch conveyor belt. At the end of the belt are two chutes with a baffle plate between them so that the material may be stockpiled on either side. The gravel is required to drain for 12 hours before being used, so in this way the material is usually piled on one side for a day, and then diverted to the adjoining pile. No question can then arise as to how long the material may have been in any one pile. The double chutes and baffle plate are constructed at the ends of all the four conveyors emptying over the stockpiles.

From one side of the 4-deck screen a long 24-inch conveyor belt carries the gravel graded from 1½-inch down to No. 4. Along the way this material passes over a Niagara 2-deck 4 x 10-foot vibrating screen. The material retained on the upper ¾-inch screen goes directly up an 80-foot x 24-inch conveyor belt and discharges over the ¾-1½-inch stockpiles.

The lower deck, a ⅜-inch screen, permits a great amount of the excess pea gravel, from No. 4 to ⅜-inch, to be sifted out from the rest of the aggregate. This excess material passes over a short 20-inch belt to a Butler 70-ton bin. There it is collected for disposal to users other than at the airfield. Even these sources are not sufficient to absorb all the surplus pea gravel, and consideration has been given to pumping most of this size material back into the pit. A 10-inch pump will later be installed for this purpose. Material for the No. 4 to ¾-inch stockpile passes from the main 24-inch belt up an 80-foot x 24-inch conveyor which is parallel to the others.

In the meantime, all the material passing the No. 4 screen at the top of the first long conveyor goes to two Lippmann 5 x 34-foot sand drags where it is washed thoroughly. A portion of the fines is moved along to a Hardinge ball mill powered by a 200-hp electric motor. Here the sand is ground down

(*Continued on next page*)

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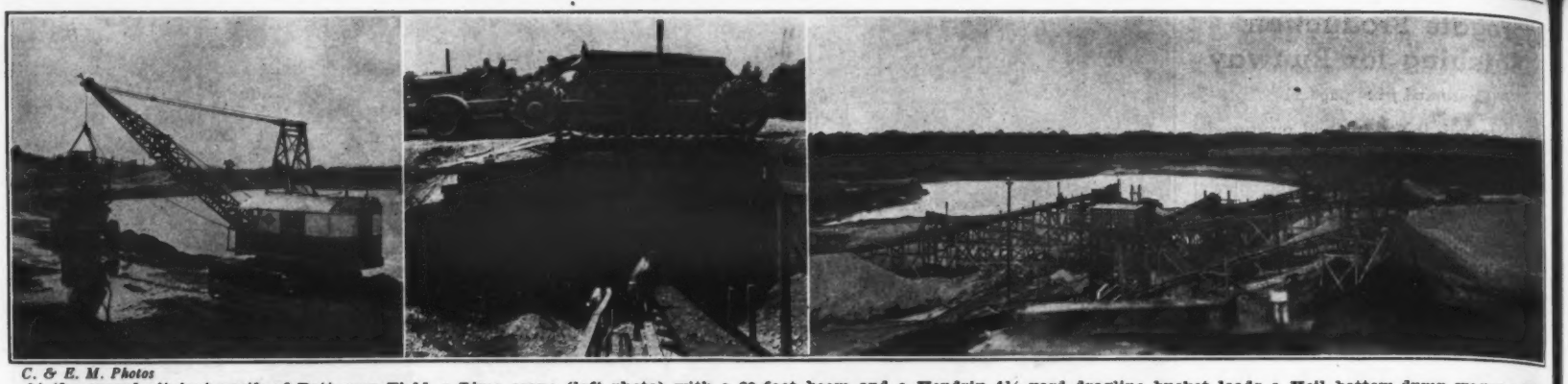

C. & E. M. Photos

At the gravel pit just north of Patterson Field, a Lima crane (left photo) with a 60-foot boom and a Hendrix 4½-yard dragline bucket loads a Heil bottom-dump wagon with 20 to 25 tons of gravel aggregate. In the center photo the Heil is seen dumping its load into the plant 100-ton sump hopper from a grating made of inverted T-rails spaced on 8-inch centers. At the bottom of the hopper is a Lippmann reciprocating feeder which sends the gravel to a conveyor belt which carries it up to a Lippmann vibrating screen. The third photo is a view of the gravel plant taken from the tower of the concrete-batch plant.

Aggregate Production, Batching for Runway

(Continued from preceding page)

considerably by the force of 10 tons of 1¼-inch-diameter steel balls contained in the mill. Every hour 25 pounds of new balls are thrown into the mill to replace the others as they are gradually worn down. The crushing action of the ball mill produces a fine sand with 95 per cent passing the No. 50 sieve, 40 to 50 per cent passing the No. 100, and about 15 per cent passing the No. 200 sieve.

This extra-fine sand is then returned on a fast belt to the regular 80-foot x 24-inch sand conveyor where it is blended with the coarser sand passing through the drags. The finished product as it is dumped on the stockpiles is a blend meeting the requirements of 3½ to 10 per cent passing the No. 100 sieve.

The plant is powered by electricity furnished by the Dayton Light & Power Co. on a 440-volt circuit. The plant is worked two shifts of 8 hours each. R. N. McGiffert of the Central States Construction Co. directed the setting up of the plant and its operations.

Concrete Batch Plant

The four different gradations of aggregate are stockpiled over a 390-foot-long tunnel constructed by the W. L. Johnson Construction Co., contractor for the runway paving project. A concrete footer, 9 feet 3 inches wide and 10 inches deep, was poured with a step cut out along each side, 1 foot 6 inches wide and 4 inches deep. For the sides, precast wall sections were poured in 10-foot lengths with a height of 6 feet 9 inches and a thickness of 7 inches. These wall sections were erected by a crane; they fit into the step footer at the bottom and are tied together at the top with 8 x 10's on 2½-foot centers. A 3-inch plank roof is laid over the timbers.

Cut into the roof of the tunnel are 24 steel gates, 14 inches square, made by the American Aggregate Corp. of Greenville, Ohio. Under the 3-inch stockpile are 4 gates; under the 1½ and ¾-inch material are 6 gates each; the remaining 8 gates are beneath the sand stockpile. A warning buzzer from the batch tower alerts the two employees in the tunnel. As an electric-light signal glows from the tower, the men open the gates indicated.

The material is discharged onto a 36-inch conveyor belt which runs for 600 feet through the full length of the tunnel and then, as it reaches the open, up an incline to the batch plant. The total length of the belt with return is 1,197 feet. Its normal working capacity is 12 tons per minute, but it can be stepped up to 17 tons per minute if it becomes necessary.

Half-way up the inclined conveyor a throw of a lever can shunt the aggregate off the belt into a Blaw-Knox 100-ton 3-compartment bin. This bin is used to load the three 2-yard truck-mixers—Jaeger, Rex, and Smith—which haul ready-mix concrete for the drainage-structure pours. The truck-mixers roll under the bin and pick up the aggregate. Then they drive under a Heltzel 300-barrel cement bin set up at the far end of the plant yard so as not to interfere with the movements of the regular batch trucks going to the pavers. Water is also added at the cement bin from a 2,000-gallon storage tank placed high enough to permit a gravity flow into the truck-mixers.

When the big plant is being charged, the aggregate moves up the conveyor, one grade at a time, to the top. There it empties into a hopper. From the hopper the material is chuted into any one of the four 100-ton 2-compartment ag-

(Concluded on next page)

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ROAD ROLLERS and MAINTAINERS

gregate bins which are lined up in a row. Two Heltzel bins painted yellow, with Kron dial scales, stand at one end; two Blaw-Knox bins painted grey, with Howe beam scales, adjoin them.

In front of the two outside bins are two Heltzel 400-barrel cement bins with a receiving hopper at the side. The cement hoppers are built up on a slight ramp, and face in opposite directions to conform with the movement of the worm gear which moves the cement from the hopper to the foot of the enclosed bucket elevator.

Bulk cement is hauled 2½ miles to the plant from the Patterson Field siding which connects with the tracks of the New York Central Railroad. Four covered dump trucks drive under a tipple at the siding to pick up a 40-barrel load of cement which is then dumped into the hoppers at the plant. About 450,000 barrels of cement will be consumed in this project, with orders being placed by the contractor ranging from 25,000 to 100,000-barrel lots.

Among the brands used and the sources of supply are the following: Miami and Universal—Osborn, Ohio; Columbia — East Fultonham, Ohio; Standard—Painesville, Ohio; Lone Star —Limedale, Ind.; Lehigh—Mitchell, Ind.; Alpha—Marlheim, W. Va.; Bessemer—Walford, Pa.; and Medusa—Wampum, Pa.

On the batch hauls the contractor employs a fleet of 15 company-owned 1½ and 2-ton Reo trucks, and additional trucks hired by the batch-haul. From 20 to 30 trucks in all are used, each carrying two batches. An efficient layout at the batch plant enables a truck to get loaded with two batches in 1 minute and 35 seconds from the time the driver enters the yard until he is pulling out on the way to the pavers.

At the entrance to the yard the trucks pause momentarily at a wooden "pulpit" or platform where a worker locks the center and tail-gates in position. Then the trucks run under either of the two Blaw-Knox bins which contain both ¾ and 1½-inch gravel in their two compartments. All bins have two discharge hoppers so that two batches can be loaded simultaneously.

After picking up part of the aggregate, the trucks next run under the cement bins. The truck that has passed under the outside Blaw-Knox aggregate bin has only to roll forward a few feet to pass under one cement bin. The other truck swings in a wide arc to get its cement from the bin at the opposite end of the plant, and then runs on under the Heltzel aggregate bin. The first truck makes a similar arc and goes under the second Heltzel bin. Each of these contains both sand and the 3-inch gravel. Thus the cement is sandwiched in between the aggregate and cannot be blown about on the run to the pavers.

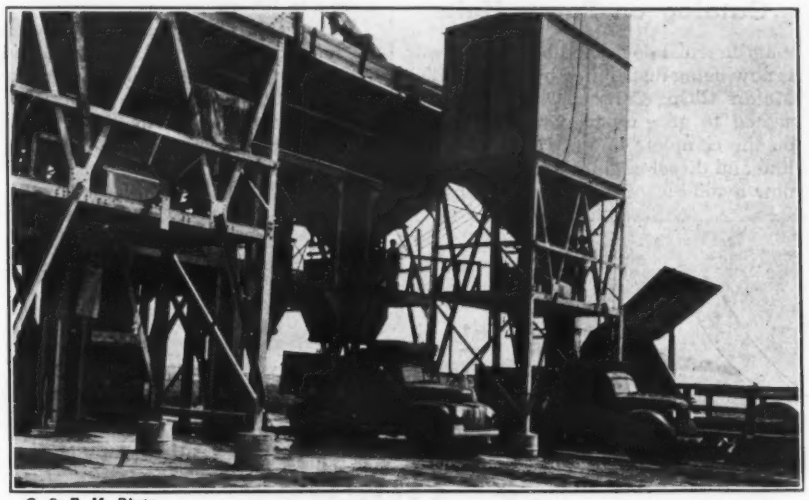
Forms for Concrete Pipe

Forms and machines for making concrete pipe from 12 to 96 inches in diameter are described in a 26-page catalog made available by the Quinn Wire & Iron Works, E. 12th St., Boone, Iowa.

It includes much technical data for use by design engineers and others interested in planning for concrete pipe. There are tables of standard dimensions for sewer or culvert pipe; a table showing the sectional area of electrically welded wire fabric for various spacings of wires; tables showing the weight per 100 square feet of wire for longitudinal and circumferential or cross wires; a table showing the comparative capacities of corrugated-metal and concrete pipes; and tables giving the estimated cost to produce all sizes of reinforced sewer or culvert pipe.

The bulletin gives a complete description of the Quinn medium and heavy-duty pipe forms—how they are constructed, how they are used, and features of operation.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 84.



C. & E. M. Photo
W. L. Johnson Co.'s batch-plant layout enables a truck to get loaded with two batches in one minute and 35 seconds from the time it enters the yard until it pulls out.

Line of Cranes Described

A catalog covering the Lorain Series 41 shovels, cranes, clamshells, draglines, and backhoes has been prepared by The Thew Shovel Co., 28th St. and Fulton Road, Lorain, Ohio. This 32-page bulletin contains a complete pictorial breakdown of the unit to show its features.

Catalog No. 44501-7 describes in detail the turntable, hoist shaft, swing shaft, standard boom hoist, 2-speed crawler travel shaft, self-propelled travel shaft, and the chain-drive crawler. These parts are illustrated individually and text is used to explain the salient features of each.

The bulletin also points out by means of photographs the various combinations available: five booms which are interchangeable on four types of mountings. It also shows the location in the cab of the various controls.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 65.

A "Caterpillar" Diesel D8 with Hyster arch makes an ideal tool for rail removal, lifting one 62-foot section at a time.

Loading trucks with broken concrete, a "Caterpillar" Diesel D7 and Traxcavator work fast without disturbing traffic.

When the firm of Charles L. Harney took on the contract for removing and replacing streetcar rails on San Francisco's famous Market Street, the time limit set was 300 days. By the ingenious use of equipment never before tried on city streets, the job was completed 187 days ahead of schedule!

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The line-up of equipment that handled the unusual contract so efficiently included a "Caterpillar" Diesel D13000 Engine, powering the compressor used on air drills and tampers; a "Caterpillar" Diesel D8 Tractor with Hyster logging arch that tore up the old rails; and a "Caterpillar" Diesel D7 Tractor with Traxcavator, for loading broken pavement into trucks.

Versatile and dependable, backed by dealer service that has won wide fame as the finest in the industry. "Caterpillar" Diesels are built to tackle the toughest jobs and return a profit to their owners.

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Convention Calendar

Dec. 2-5—Highway Research Board
Annual meeting, National Academy of Sciences and National Research Council Bldg., Washington 25, D. C. Roy W. Crum, Director, 2101 Constitution Ave., Washington 25, D. C.

Dec. 7-10—SE Highway Officials
Annual meeting, Southeastern Association of State Highway Officials, McAllister Hotel, Miami, Fla. Col. M. E. Cox, Secretary-Treasurer, Chief Highway Engineer, State Highway Board, Atlanta, Ga.

Jan. 26-28, 1948—ARBA Conference
Conference, American Road Builders' Association, Washington, D. C. Charles M. Upham, Engineer-Director, International Bldg., Washington 4, D. C.

Feb. 9-12, 1948—AGC Convention
Annual convention, Associated General Contractors of America, Baker and Adolphus Hotels, Dallas, Texas. H. E. Foreman, Managing Director, Munsey Bldg., Washington 4, D. C.

Feb. 15-19, 1948—AED Convention
Annual meeting, Associated Equipment Distributors, Edgewater Beach Hotel, Chicago, Ill. Frank G. Knight, Executive Secretary, 360 No. Michigan Ave., Chicago 1, Ill.

July 16-24, 1948—ARBA Road Show
Road Show, American Road Builders' Association, Soldier Field, Chicago, Ill. Charles M. Upham, Engineer-Director, International Bldg., Washington 4, D. C.

Penna. Turnpike Extension

Real progress has been reported on plans for extending the Pennsylvania Turnpike from Carlisle to Philadelphia. Several outes for this 120-mile stretch have been submitted and are under consideration by the Turnpike Commission. Bids are being asked for aerial topographical surveys of the entire route, and the engineers expect to be at work on detail design this autumn and winter.

Consideration is being given to making the new section of road similar to the existing toll Turnpike. The maximum grade will probably be not over 2 per cent. The route will by-pass all communities and valuable agricultural areas.

The engineering work is being done by Gannett Fleming Corddry & Carpenter, Inc., engineers of Harrisburg, Pa., and New York, N. Y., under the direction of Roger B. Stone, Chief Engineer of the Turnpike Commission.

Water Tanks; Fire Pumps

A folder describing its line of portable drinking-water tanks and fire pumps has been prepared by D. B. Smith & Co., Main St., Utica 2, N. Y. It shows the features of construction of these units, and lists the advantages claimed for them.

The photograph of the Indian drinking-water and supply tank shows the 4-inch opening for filling the tank, the pouring spout, and the drinking-water faucet. A large spread shows the Indian fire pump.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 56.

Catalog on Power Units

Its first catalog since before the war is now being distributed by the Hercules Motors Corp., Canton, Ohio. It is designed to give up-to-date information on the complete line of Hercules gasoline and diesel engines and power units now available. These vary in capacity from 3 to 400 hp.

The gasoline engines are offered in 13 series and 27 models in 2, 4, and 6-cylinder sizes. They can be furnished for operation on gasoline, natural gas, kerosene, or butane. The diesel engines are built in 9 series and 22 models in 2, 4, 6, and 8-cylinder sizes.

The catalog lists in detail the Hercules engines and power units, and also describes the accessories available, power take-offs, reduction gears, etc. Information is given throughout the book to assist the power user in choosing the most suitable power for the job.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 60.

AN intangible but vitally important element in construction equipment is the engineering which gives it structural strength, economical operation and long-life. But Butler Engineered Design goes farther: The site, the size and type of work, accessability of materials, their volume and their transport are all given careful study and are reflected in the greater efficiency of Butler Construction Equipment.

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is located between pages 84 and 85 to request literature available to our readers without charge or obligation.

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C. & E. M. Photos

In the photo at the left, taken from the side of Clear Creek Canyon, can be seen the power poles, office building, and compressor house erected for the Austin Co. job. The right-hand photo, taken from the top of a Koehring Dumptor, shows the east portal of the tunnel where it starts under the granite mountain. In the center photo, General Superintendent L. A. Stiles, left, looks over his lumber supply as two workmen hew shoring timbers.

Tunnel Is Bored Through Granite

New 860-Foot Tube Will Carry U. S. Highway 6 At Water Level Through Mountainous Canyon

UNDER a $339,000 contract with the Colorado State Highway Department, a new 860-foot highway tunnel is being pushed through a granite mountain near Golden, Colo., by John R. Austin Construction Co. of Denver. Officially, the contract was awarded to Larson Construction Co. of Denver, but John R. Austin's crews and equipment are doing the job.

The project includes drilling the tunnel, and grading about 0.75 mile of new highway through the steep-walled Clear Creek gorge about 2 miles west of Golden. The grading includes about 10,000 cubic yards of rock excavation, all to be hauled through the new tunnel and dumped along a wide spot in Clear Creek Canyon. Tunnel excavation is running 22 cubic yards to the linear foot.

Colorado's highway system is not as old as many other states', particularly through the precipitous Rocky Mountain section. This project, begun April 8 this year and due to be finished in April of 1948, will add to that system another usable route through extremely mountainous terrain.

A 7 x 7-foot pilot bore was drilled by Pioneer Construction Co. before the present contract was let. It serves two very useful purposes. State highway engineers are now able to predict fairly accurately just how much of the tunnel will be unlined, how much will have to be shored, and so on. The presence of the pilot bore also makes it possible to drill the main tunnel without using a ventilating fan. Heavy air drafts down the canyon blow continually through this hole, and are clearing out the powder smoke in less than 5 minutes.

The new tunnel is to be 32 feet wide at the base, with a vertical cut 5 feet 6 inch above the floor line. At that point the tunnel top is shaped on a 16-foot radius in the unlined sections, 17 feet 8 inches in the sections where timber shoring may be required.

It will rise on a 3 per cent grade from east to west portal. Starting with a 5-degree curve, it will then carry straight for 720 feet of tangent section, and come out at the west portal on an 8-degree curve.

Organization Set-Up

When the John R. Austin Co. moved

(*Continued on next page*)

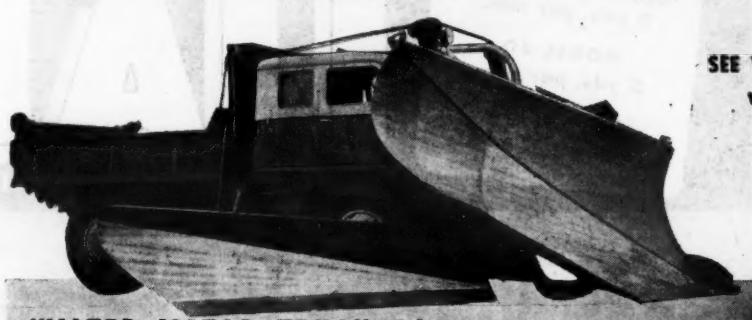
—both made possible by the *100% TRACTION* of *WALTER 4-POINT POSITIVE DRIVE*

YOU meet all kinds of snows in a Winter—from average falls to raging blizzards and deep drifts.

Walter Snow Fighters bring you distinct advantages for *every* type of snowfall. In light to normal snows (few inches to few feet), Walters maintain speeds of 20 to 30 mph. to provide wide dispersion. At such high speeds, the required number of trips is made faster—more miles are cleared per hour—spreading action minimizes re-handling of the same snow—banks and windrows are avoided.

In very deep snow and drifts, the tremendous power and traction of Walter Snow Fighters smash through without slipping or stalling. The special design and rugged construction show to full advantage in this punishing work.

Walter Snow Fighters are available in models from 150 to 300 hp., gasoline or diesel, with wide choice of correctly designed plows and special equipment to meet your special needs.



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WALTER SNOW FIGHTERS

C. & E. M. Photo
A driller uses an Ingersoll-Rand drifter drill in Clear Creek Tunnel near Golden, Colo. This new 860-foot tube will carry U. S. 6 at water level through steep-walled Clear Creek gorge.

Tunnel

(*Continued from preceding page*)

in to start the job, it had a number of unusual problems to face, chiefly dealing with the disposal of material. The specifications require that, for flood-control purposes, the contractor maintain a minimum width of 40 feet at the bottom of the high-walled gorge, so that Clear Creek may have a free channel.

Compliance with this provision makes it necessary to haul the broken stone for a distance of about 1,900 feet from the center of the tunnel, and of course considerably farther for the 0.75-mile rock grading project.

Austin moved in an office building; a change shed and a compressor house was built. Two big Ingersoll-Rand BE-1670 four-stage compressors, rated at 1,700 cfm at sea level, were brought in and set up in this shed. They had seen two years of service previously on another tunnel job near Leadville. Two General Electric 250-hp synchronous electric motors were set in to drive the two big compressors. Because of the high altitude—7,000 feet—the machines are actually delivering about 1,500 cfm at four-stage operation.

A 6-inch steel air header, with two air receivers 54 inches in diameter and 10 feet long, was laid from the compressor house to the tunnel portal. Electric power was brought in at 13,200 volts from the Colorado Central Power Co. transmission lines a few miles from the job.

A service road and yard was cleared and leveled to store machines and supplies which would be used in construction. With the stage thus set, operations started on the tunnel face-off.

Preliminary Work Slow

On account of the seamed and broken character of the native Clear Creek granite rock, the first few rounds had to be drilled and shot very carefully to get started into the mountainside. After the first preliminary face-off, a 5-foot round was pulled and mucked out. Two more 5-foot rounds followed. Then the length was stepped up in 2-foot increments, with a 15-foot round the ultimate goal. The first rounds were very heavily drilled but shot lightly to keep from breaking too much rock outside the pay line.

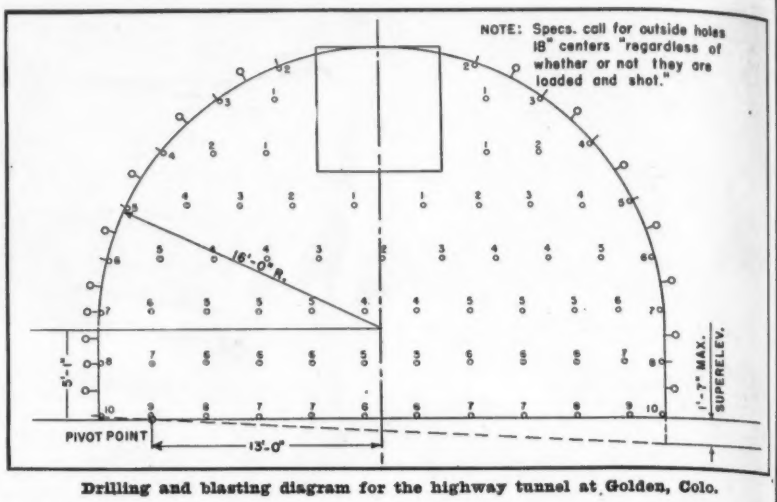
Rounds Now Standardized

When CONTRACTORS AND ENGINEERS MONTHLY's Western Editor visited the work at Golden, the crews had mucked in to the point where the next few rounds would see the job thoroughly "lined up". The standardized procedure for each round is something like this:

1. A shop-built drilling jumbo, mounted on a semi-trailer and handled by a D6 Caterpillar tractor, is backed in to drilling position against the rock face. This jumbo carries a battery of 11 Ingersoll-Rand DA-35 drifters, and can carry several more if necessary. However, the job is set up to allow just one 15-foot round to be drilled, loaded and shot on one 8-hour shift.

The specifications call for all outside holes on 18-inch centers "regardless of whether or not they are loaded and shot". All rib holes have to be at least 18 inches from the wall lines to prevent any overbreak. Rib, breast, and lifter holes total about 90 for a 15-foot round. The usual cut holes do not receive the attention on this job they do on other rock tunnels, because blasting of the Clear Creek face is being directed towards the pilot bore. The 90-hole set-up gives each drift drill about 8 to 9 holes, for a footage of about 120 to 135 per 8-hour shift.

(*Continued on next page*)


NOTE: Specs. call for outside holes 18" centers "regardless of whether or not they are loaded and shot."
16'-0" R.
5'-1"
1'-7" MAX. SUPERELEV.
PIVOT POINT
13'-0"

Drilling and blasting diagram for the highway tunnel at Golden, Colo.

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You can't beat the STRAIGHT LINE CONTINUOUS LOADING principle of the Haiss bucket loader. This machine will handle 3 times the yardage of machines that sell for double its price. Engineered end to end . . . top to bottom . . . featuring a rugged, oil-bath-enclosed transmission that can "take it" . . . and manganese steel digging blades for hard abuse . . . you can count on Haiss for mechanical reliability. Complete information will be sent promptly upon request to

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with high elevator
3 yds. per min.
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5 yds. per min.
MODEL 135
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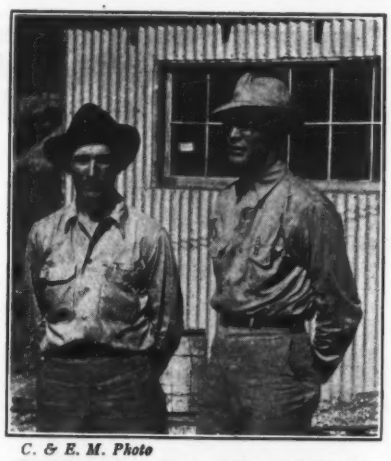
PETTIBONE MULLIKEN CORPORATION
Conveyors • Material Handling Pumps • Dragline and Clamshell Buckets • Shovel and Pull Shovel Dippers

Ingersoll-Rand detachable Jackbits are being used on Ingersoll-Rand steel which changes in length every 2 feet. The DA-35 machine has 30 inches of stroke available, and the change is easy. Drill bits lose gage and dull in about 24 inches of travel, making it necessary for the driller's helper to discard the bits rapidly. Bits are resharpened in Denver, frequently as often as eight times before they are thrown away.

When drilling has finished, the jumbo is pulled back away from the tunnel face to a safe distance, usually at least 150 feet.

2. Powdermen then move in very rapidly with du Pont Gelex No. 2 powder in 8-inch sticks. The gelatin powder is loaded at an explosive ratio of approximately 3 pounds per cubic yard of granite to insure excellent breakage. Each hole is equipped with a Hercules electric primer, and delays from 1 to 10 are used from the pilot bore towards the rib holes. The shots are pulled by firing each round from a 440-volt power line. Usually about 77 of the 90 holes drilled are shot.



C. & E. M. Photo

Superintendent L. A. Stiles, right, and Assistant Frank Peters talk over some of the unusual problems they had to face on the Clear Creek Tunnel job—especially the disposal of material.

3. For about 5 to 10 minutes the natural current of air which moves down through the canyon blows through the pilot bore and clears away the smoke. Meanwhile, equipment operators are preparing to move in for the next step.

4. Four Koehring Dumptors with a Northwest ¾-cubic-yard shovel then move in to clean up about 330 cubic yards of broken granite. The boom and dipper stick of the Northwest shovel was shortened to allow it to work in the tunnel space, limited as it was for headroom.

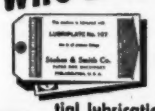
The Dumptors dump their loads downstream from the east tunnel portal, where a rock fill of about 15 feet can be made along a bend in the stream. Disposal of excavation along the steep gorge walls in Colorado has plagued many a contractor on highways from time to time, and this job is certainly no exception.

As it appears now, the Northwest shovel will be able to handle a 330-cubic-yard round in an 8-hour shift. When it finishes, the tunnel face will then of course be ready for the entire

(*Concluded on next page*)

NOW

WHO'LL LUBRICATE IT?



The LUBRIPLATE Tag Service assures the machinery manufacturer, who uses LUBRIPLATE for initial lubrication, that the machines will be serviced with the same outstanding lubricant. Machine Builders, use the Tag Plan. Machine users, mail the post cards you find on the equipment.

℞ FOR YOUR MACHINERY

No. 2 — Ideal for general oil-type lubrication, ring oiled bearings, wick feeds, sight feeds and bottle oilers.

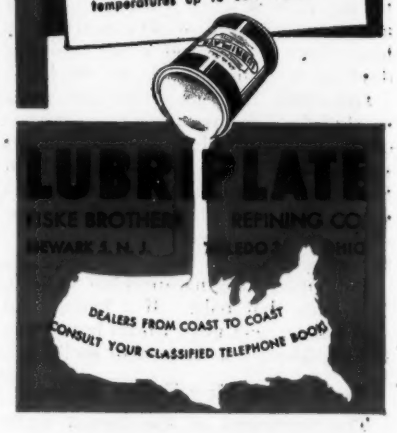
No. 8 — Because of high film strength and long life it reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107 — One of the most popular grease type products for general application by pressure gun or cups.

No. 70 — For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA — Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING — This is the LUBRIPLATE Lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.



Make it hot...on the spot!

Truck-mounted Booster. Heats by direct firing. Loads direct to distributor or returns to tank car. 2 sizes for truck or trailer mounting.

Check These Advantages

- Heats material 3 times as fast as steam.
- Heats to higher temperatures.
- No steam or water necessary.
- Heats only amount of material required.
- Circulates material while heating — no separation or damage — assures uniform application.

Get All the Hot Material You Need for Volume Operation AND GET IT FAST...with Cleaver-Brooks Portable Boosters

IF speedy and economical handling and heating of pumpable bituminous material is your problem — then it will pay you to investigate Cleaver-Brooks Portable Pumping Boosters.

With Cleaver-Brooks Boosters, the heating speed does not depend on the size and conditions of tank car coils. It heats direct and 3 times as fast as any other method. What's more, you need only heat the amount of material you need — no heating of the entire car.

Cleaver-Brooks Boosters are reliable, long service, low maintenance units. Most of the original models, built 15 years ago are still giving dependable every day service. There are more Cleaver-Brooks units in service than any other make. For full details write for bulletin RM 102.

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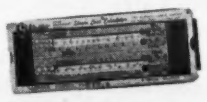
Cleaver-Brooks

TANK CAR HEATERS...BITUMINOUS BOOSTERS...
AUTOMATIC STEAM PLANTS



Write on Your Business Letterhead . . . For the Bituminous-Mix Calculator — a ready reference slide rule showing weight of mix needed in lbs. and tons based on area and depth of area to be covered.

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A hotel planned and designed for your every comfort . . . assuring you absolute rest and relaxation . . . amid an atmosphere of refinement . . . Beautifully furnished rooms . . . Ocean front verandas . . . Rooftop solarium . . . Salt water baths . . . Cuisine unsurpassed . . . Garage on premises. Open all year.

Exclusive Pennsylvania Avenue and Boardwalk

C. & E. M. Photo
Driller Ernest Halford holds up tenderly, for the camera, the MSA hard hat which probably saved his life on the Clear Creek Tunnel job.

Tunnel

(*Continued from preceding page*)

performance to be repeated.

The job is set up on a production schedule so figured that the drills, the powdermen, and incidental labor can just drill and shoot one full round in 8 hours, preferably on the swing shift from 4 p. m. to 12:30 a. m. Broken rock can then be mucked out in the day shift from 7:30 a. m. to 4 p. m., during daylight hours, so the Dumptor operators and State Highway Department representatives can see how to dispose of the material.

For the first week or two at least, however, drilling and shooting was done on the daylight shift until the drill crews were fully organized.

Driller Has Narrow Escape

The morning the job was visited, a hard hat worn by Ernest Halford, a driller, proved that safety measures pay dividends. Halford had scarcely begun his day's work when a sharp chunk of granite weighing about 40 pounds broke loose from above and came crashing down to hit him squarely on the head.

His MSA Bakelite hard hat stood most of the force, though a sharp corner of the chunk punched through the hat just enough to rip a painful gash in Halford's scalp. First aid was administered, Halford went to the doctor under his own power, and returned to the job in about an hour.

Picking up his punctured hat, he said, "I'll keep that baby. If I hadn't had that hat on, *you* guys would have been talking about this instead of me!"

Extra Work May Follow Tunnel

The treatment of the tunnel walls depends entirely on what the final inspection of the rock discloses; 12 x 12 timber shoring, placed on from 3 to 4-foot centers, will brace both portals and will be used wherever else the Resident Engineer believes it necessary. If the tunnel walls are weak enough to require shoring, the tunnel may be lined at a later date with concrete 1 foot thick, for Colorado has that provision in its standard tunnel specifications.

It is believed that even in the good rock, a 2-inch layer of Gunite will be applied later on, in three applications, under a contract extension or another contract. No one can tell accurately what the seams and dips will do. When the pilot bore was drilled, engineers found a bitumen seep oozing up from a crack in the granite. Geologists at the Colorado School of Mines at Golden couldn't believe their eyes, but they believed the laboratory technician who analyzed the sample. No one yet knows where it came from.

So far the ground water has not been too heavy. There is some, of course, but not so much as to interfere with drilling.

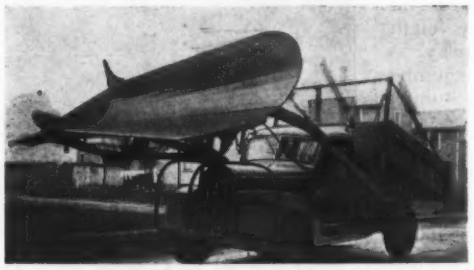
Austin expects to handle the 0.75-mile excavation job on the other side of the tunnel with Ingersoll-Rand portable compressors, Ingersoll-Rand J-50 Jackhamers, a Northwest 80-D shovel for loading, and enough Koehring Dumptors and possibly some dump trucks to keep the shovel busy.

The job is moving along close to schedule, with the probabilities strong that the schedule may be beaten.

Personnel

Known by its Federal-Aid number of F 81 (13), the job was designed and is being done under the general supervision of Mark U. Watrous, State Highway Engineer, with Division Engineer E. E. Montgomery administering the contract locally.

For John R. Austin, the job is being pushed by L. A. Stiles, General Superintendent, with Frank Peters as his assistant. Fred W. Miller of Denver is the Resident Engineer for the state, with E. H. Dauchy as Job Engineer.



Use a
TRUK-LODER SNOW-PLOW

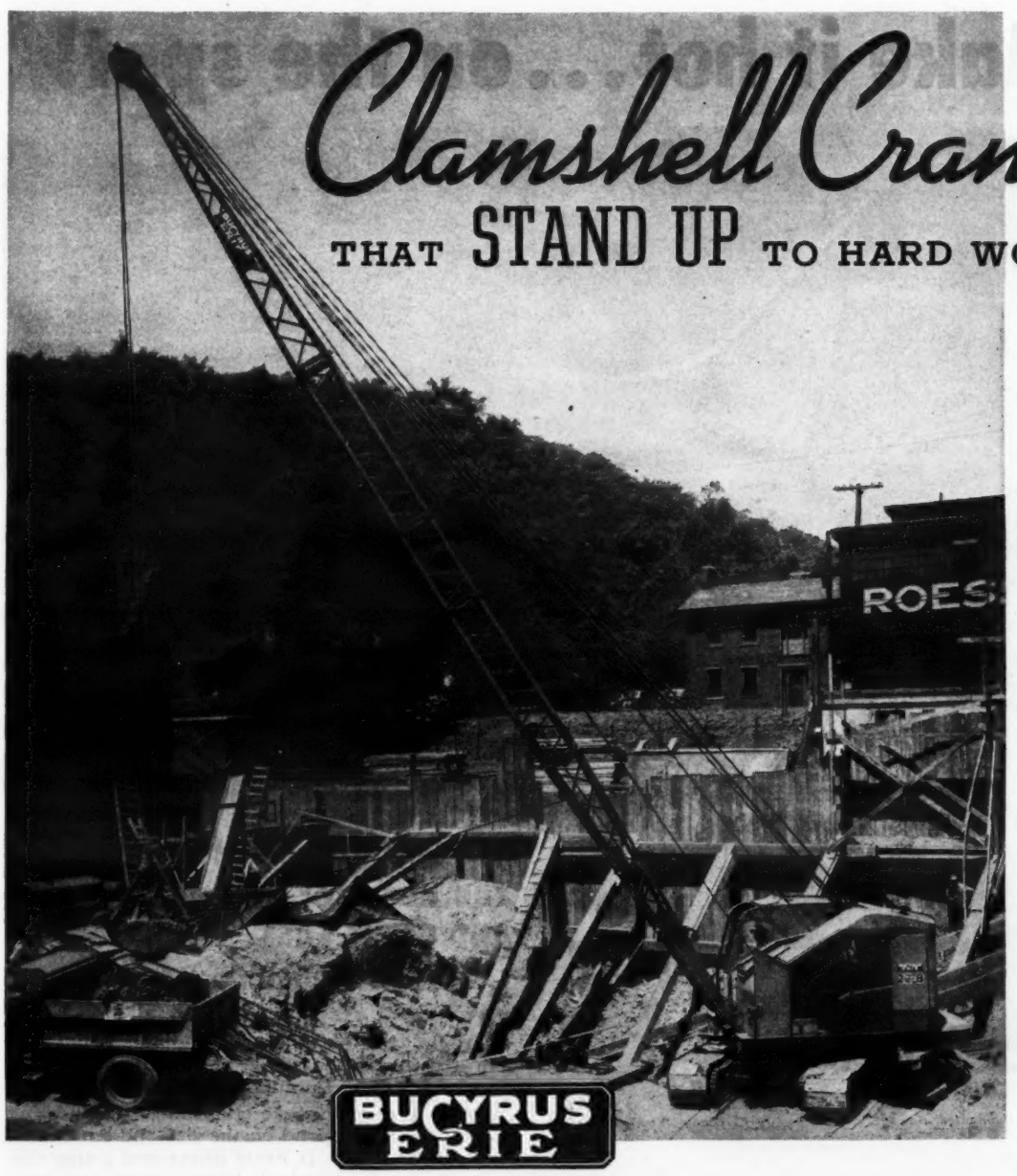
It's a low-cost, easily-mounted and speedy plow that can be readily attached to any standard 1½-5-ton dump truck. Truk-loder mounting gives full clearance lifting height of plow where backing is necessary.

INTERCHANGEABLE WITH SCOOP

Handles any loose material—loads a truck in 2 to 3 minutes. Scoop has ½-yd. capacity. Soon pays for itself in time saved.

Send for details!

TRUK-LODER CO. TIFFIN, OHIO



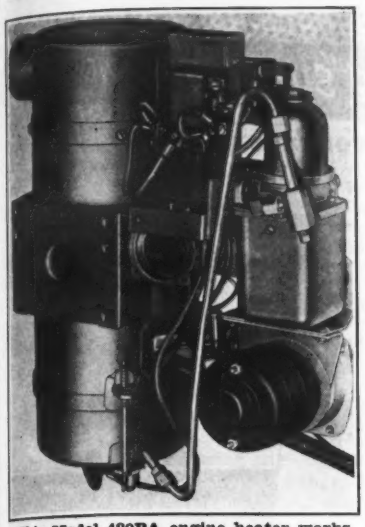
THE SAME stability and ease of operation that make the Bucyrus-Erie ⅜- to 2½-cu. yd. machines such standouts as lifting cranes and draglines give them a high degree of efficiency in clamshell work.

Their stability is attained by efficient distribution of weight for a low center of gravity, plus sure-footed mountings with large heat-treated steel treads which carry them safely and surely over soft or loose ground and uneven terrain. Big, simple, durable clutches and brakes, responding smoothly to conveniently placed controls, enable the operator to maintain a fast-paced cycle — to hoist, swing and dump with a quick sureness that effectively boosts output. A strong, latticed box section boom of all-welded construction stands up under swing and compression stresses, can handle big loads.

Outstanding clamshell performance is only one of the services you can expect from Bucyrus-Eries. Each machine in the ⅜- to 2½-cu. yd. line is readily convertible in the field to various front ends and produces high-quality results with any type. Let your Bucyrus-Erie distributor show you how these famous machines can build profits for you.

100E47

BUCYRUS-ERIE COMPANY



This Model 480PA engine heater works by heating the engine coolant. It is designed for use when the vehicle is in motion, or as a stand-by heater when the equipment is not in service. There are four other models available.

Engine Heater Raises Coolant Temperature

Engine heaters for quick starting and continuous operation of equipment in cold weather are made by the Perfection Stove Co., 7600 Platt Ave., Cleveland, Ohio. These units work by heating the engine coolant. Also, since they utilize the heat from exhaust gases, a hot-air or external liquid heat exchanger may be added. The heat thus generated serves to warm the oil, battery, cab, cargo, and other parts of the equipment.

The Superfex heaters are furnished for either completely automatic, thermostatically controlled operation, or for varying degrees of operator control. They come equipped with a steel heat exchanger for coolant circulation, operating with a thermosyphon head. It is said that exhaust gases can be carried beneath the heater and further utilized for oil-pan heating and similar applications.

There are five models of heaters; these are basically similar, but each is designed to meet various requirements. Physical dimensions of all of them are small enough to permit mounting under the hood of automotive equipment, on the frame in the wheel housing, or between the radiator and grill.

The Models No. 480PA and 480PM are designed for use when the vehicle is in motion, or as stand-by heaters when the equipment is not in service. They come furnished with electric fuel pump, electric ignition, and dashboard-mounted controls. They are of the vaporizing-burner type and are designed primarily for gasoline fuel. Combustion air is furnished by a small 3-watt motor and blower. The unit is convertible to operation with kerosene or fuel oil.

Models No. 460 and 480 F are recommended by the manufacturer as stand-by heaters, for use when equipment is not in motion. They are operator-controlled at the panel and have electric ignition. Gasoline is supplied from a gravity head to the float chamber and through a wick feed to the burner, or through an electric fuel pump. The Model 406C serves as a stand-by heater, for use without electric current. This model is controlled manually at the heater and operates on kerosene.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 2.

Rubber-Tired Dozer Unit

A broadside illustrating and describing the Model C Tournadozer has been prepared and is now available from R. G. LeTourneau, Inc., Peoria, Ill. Folder No. TD-109 opens up to 23 x 33 inches.

All of the new design features are explained by large-size job-action photos. A short paragraph is devoted to each of these items: the big low-pressure tapered-bead tires; the four speeds forward and reverse; the ease of operation; the non-stop instantaneous speed selector; the finger-tip steering and blade operation; and the high blade lift, the low drop, the big load capacity.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 85.

Portable Gravel Plants

Descriptive literature on its portable crushing, screening, and loading plants is being distributed by the Rogers Iron Works Co., 3913 Charles Block, Joplin, Mo. Feature of Bulletin No. G-201 is a list of thirteen reasons why Rogers feels its plants are outstanding.

Photographs show the main plant with the elevator folded, ready for travel; with the elevator in working position; and assembled with various conveyors and bins in their respective positions.

Layout drawings show the Model No. CGWD portable dual crushing, screening, loading, and washing gravel plant, and the Model CGD portable dual crushing, screening, and loading gravel plant. Complete specifications are listed for the Models No. CGS and CGD.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 81.

Asphalt Institute Office

Herman C. Helmle has been appointed District Engineer in charge of The Asphalt Institute's newly opened Springfield, Ill., office located at 520 So. 6th St. Part of District III, Mr. Helmle's territory covers Illinois, Wisconsin, Minnesota, Iowa, Missouri, and Arkansas. Mr. Helmle was formerly with the Illinois Division of Highways.

for Heavy-Duty Hauling!

Model B

MILLER TILT-TOP MACHINERY HAULING TRAILERS

Miller trailers are made to fit every hauling requirement, with 3½ to 8 ton models! "Bulldozer" type shown in illustration will handle International TD-9 with Bulldozer blade. Model "B" for narrow, heavy units like steam rollers. Easy loading under all conditions. Winch optional on all models.

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MultiFoote 34-E Duo Mix (Dual Drum) Paver with elevating boom loading to a Pumpcrete.

MULTIFOOTE ELEVATING BOOMS CLEAR 20 FT.!

A recent Foote Company ad got through with a typographical error saying that the MultiFoote elevated boom would clear 8½ ft. It isn't so! MultiFoote standard elevating booms will clear 18½ to 20 ft. and there are MultiFoote elevating booms in service, of special design, that will clear much more.

- 18½ to 20 ft. clearance.
- The only elevating boom proved in years of service.
- Bucket is adjustable to boom angles.
- All bucket operating mechanism is outside bucket.

Here is the elevated boom you need, a boom with real field experience of several years behind it. Available on 27-E Pavers, 34-E Single Drum Pavers and the 34-E Duo Mix—the big, fast MultiFoote Dual Drum Paver. Ask our sales agents for details.

THE FOOTE COMPANY, INC.
1916 State Street Nunda, New York

Builders of Adnun Blacktop Pavers, MultiFoote Concrete Pavers and Foote Kinetic Mixers

MULTIFOOTE CONCRETE PAVERS

ADNUN BLACKTOP PAVER

Southern State Has Snow-Ice Problem

Kentucky Uses Salt With Good Results in Winter Maintenance; New Trucks With Plows Remove Snow

✦ ALTHOUGH well below the Mason-Dixon line, the Commonwealth of Kentucky is not immune from winter's ice and snow. Consequently the State Department of Highways, charged with the maintenance of some 10,200 miles of roads in its system, must cope with the forces of nature not commonly associated with the sunny Southland.

Fortunately for the Maintenance Department, the snow and ice for the most part occur only in the eastern part of the state. But the hills and mountains of this section only make more acute the problem of keeping roads open and safe for traffic. In this part of Kentucky the curves are sharp and continually reversing, tangents are few and far between, and grades are steep with the vertical profile changing constantly.

While it can hardly be termed a "snow belt", this eastern section can and does frequently resemble a northern state when covered by a mantle of snow and ice. The winter elements affect mostly a crescent-shaped area beginning along the Ohio River in the north and curving east and south from there through the eastern range of mountains that extends down to the southern part of the state. The central bluegrass region and the western counties are seldom bothered by very deep snow, although Paducah last winter experienced some trouble with ice.

Ice Control

Ice control is the major problem of winter maintenance. The snowfalls are usually not very deep—only from 2 to 5 inches as a rule except in the upper levels of the mountains. When the temperature stands between 28 and 32 degrees F, however, this light fall of snow soon becomes packed and hardens into ice. Then the combination of hills and sharp curves with a coating of ice creates a hazard to traffic. Salt, the coarse crystal-rock variety, is now being used with satisfactory results to control the ice and keep the roads safe.

Its use is comparatively new in Kentucky, having been instituted only two years ago. Last winter 4,000 tons were consumed in de-icing the roads. Its use was so popularly received by highway travelers that more will be made available for this winter if conditions warrant.

Since adequate facilities for storing the rock salt in bulk quantities are not available, it is normally purchased and handled in 100-pound sacks.

It is applied chiefly through "salt shakers"—metal bins or troughs which are hooked on at the tail-gates of trucks. The State contracted for the manufacture of 100 of these items which have perforated bottoms through which the salt is spilled out in a gravity flow as the truck moves down the center of the road.

One or two men work in the body of the truck, emptying the bags of salt into the dispenser. The discharge of material is controlled by means of a lever on the shaker. On the average, 400 pounds of salt are distributed per mile of 2-lane highway to achieve best results. On Kentucky's 4-lane 40-foot highways this amount is just doubled. Spinner-type spreaders are also employed to some extent in the distribution of salt, but these are used mostly for dispensing abrasives.

Last year about 75,000 tons of abrasives were stockpiled at strategic locations on curves and hills so as to be readily at hand when required. While this material did not, of course, remove the ice, it did make roads safe and passable during and after snow and sleet storms. Sand taken from near-by pits was the abrasive in most common use, but some cinders and burned shale also served in the same capacity.

The stockpiles were set up in the autumn and some calcium chloride was interspersed with the abrasive to keep it from freezing solid and thus becoming difficult to load into trucks when it was needed. Some calcium chloride was also sprinkled over the tops of the piles. Just a thin layer, enough to provide traction, sufficed when abrasives were scattered on the road.

Snow Plowing

Snow plows are given the get-ready signal when one inch of snow has fallen, and if the storm continues they are called out on the road. Kentucky re-

(*Concluded on next page*)

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here's why...

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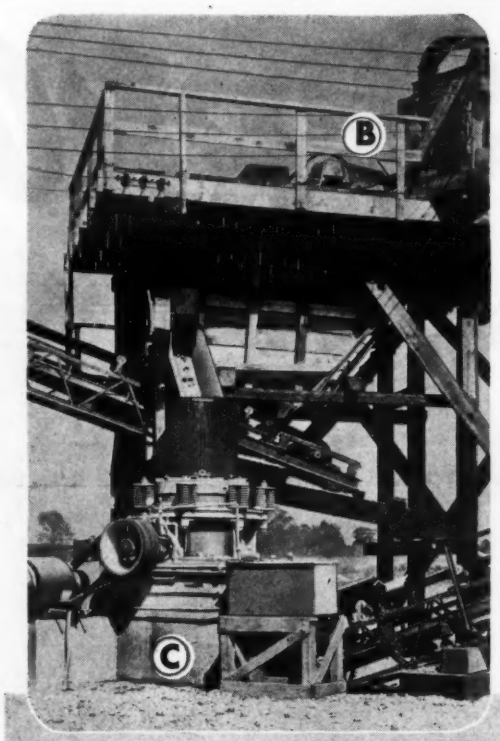

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designed and equipped

The Waupaca Sand & Gravel Co. plant at Custer, Wis., will handle about 175 tons per hour—producing concrete aggregate, 1½" to ¾"; ¾" to ⅜"; pea gravel and concrete sand. It is owned and operated by F. F. Mengel Co., Wisconsin Rapids, Wis.

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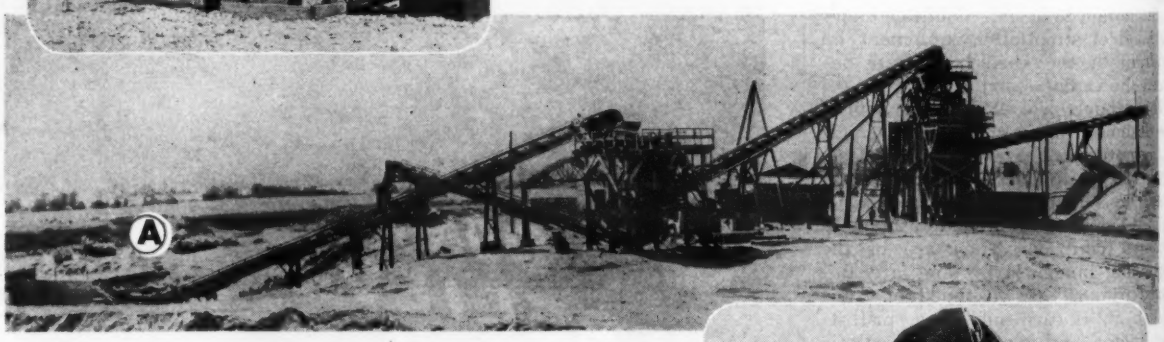

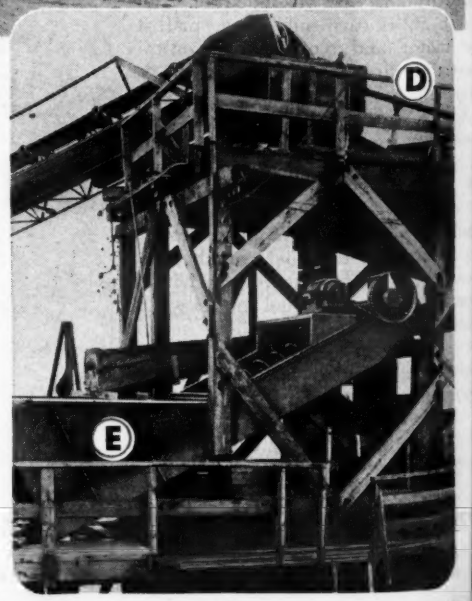

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"We wish to express our satisfaction with the gravel washing and screening plant you sold us. Each separate unit does exactly the work it was purchased for, with ample capacity and quiet running which makes for long life. Thank Elmer Kraig for the very fine drawings he made. We built each unit separate and when we set the conveyors and machines they were just where they should be with no changes necessary."

Telsmith's 40 years of engineering *know-how* is at your disposal. *Consultation without obligation*. Send for Equipment Guide G-34.

G-14

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51 East 42nd St. New York 17, N.Y. — 211 W. Wacker Drive Chicago 6, Ill. — 713 Commercial Trust Bldg. Philadelphia 2, Pa. — 247 Third Street Cambridge 42, Mass. — Boehck Eqpt. Co. Milwaukee 3, Wis. — Mines Eng. & Eqpt. Co. San Francisco 4, Calif.

Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash. • Brandeis Machinery & Supply Co., Louisville 8, Ky. • Southern Eqpt. & Tractor Co., Monroe, La. • Rish Equipment Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7 & Richmond 10, Va. • Wilson-Weesner-Wilkinson Co., Knoxville 8, & Nashville 6, Tenn.

cently acquired 10 straight-blade plows, hydraulically operated, which are attached to the front of 2 or 3-ton trucks. In addition, it recently purchased 7 Four Wheel Drive trucks which are equipped with underbody blades that have proved very serviceable in winter road maintenance. These latter units have been used effectively in moving both heavy snow and hardened ice. Other equipment that on occasion has been pressed into service includes motor graders and tractor-dozers.

The snow-removal and ice-control program comes under the direct supervision of the seven District Engineers who head the seven districts into which the state is divided. The district heads requisition the materials that are needed and use their regular maintenance forces on the work. During the rest of the year when they are trimming shoulders or opening ditches, they are also preparing the highway for winter so that melted snow and ice can be drained quickly from the pavement. About 2,900 are employed as maintenance workers operating out of the district headquarters and the central office located in the capitol at Frankfort.

The Kentucky Department of Highways is headed by J. Stephen Watkins, Commissioner, with T. H. Cutler as Chief Highway Engineer. H. H. Palmer is Director of Maintenance.

Creosote-Production Outlook for '47 Good

Although domestic creosote production remains below pre-war requirements, it is expected that the nation's 240 wood-preserving plants will maintain their present output of construction lumber, transmission poles, railroad ties, fence posts, and other chemically treated wood products. This will be accomplished by improved blending practices, extensive use of substitute preservatives, and other means of stretching the present supply.

The estimated production of treated forest products in 1947 will be approximately 3,500,000,000 board-feet. Domestic supplies of coal-tar creosote will be supplemented by approximately 18,000,000 gallons being imported this year from England. England's current exportation of this preservative is about half of her normal pre-war rate. U. S. production of creosote for the first six months of this year is approximately 18 per cent above the same period in 1946, according to the U. S. Tariff Commission. Monthly production averaged 13,969,817 gallons to July 1.

In addition to blends with creosote, wood preservers are making wider use of more specialized preservatives like Wolman salts and chromated zinc chloride. Previously, these were used only where the odor, inflammability, or skin-irritating properties of creosote were objectionable, or where it was necessary to paint the treated wood.

Other attempts to meet this situation have been numerous. Two west-coast plants are using a creosote-type of preservative distilled from petroleum-oil tar. Northern railways have employed lignite-tar creosote produced from lignite coal. Water-gas tar creosote is also used. Some attempts have been made to fortify petroleum with oil-soluble toxic compounds. A number of new treating plants built during the war, and unable to obtain creosote, are using such fortified mixtures.

Line of Chain Hoists

A new line of differential chain hoists in capacities from ¼ to 1½ tons has been announced by the Chester Hoist Co. of Lisbon, Ohio. The hoists are built to stand severe punishment, it is claimed, and to have a high rate of safety. The manufacturer states that they will hold a load at any point and will not self-lower.

Features of construction include the following: full-weight accurately cast sheave wheels, high-tensile-strength malleable-iron frames with reinforcing ribs, drop-forged heat-treated hooks, special-analysis hoist chains precision-made to fit the sheave pockets, and a lower hook mounted on ball thrust bearings for easy alignment of the loaded chain to the upper pocketed sheave and swiveling of the load.

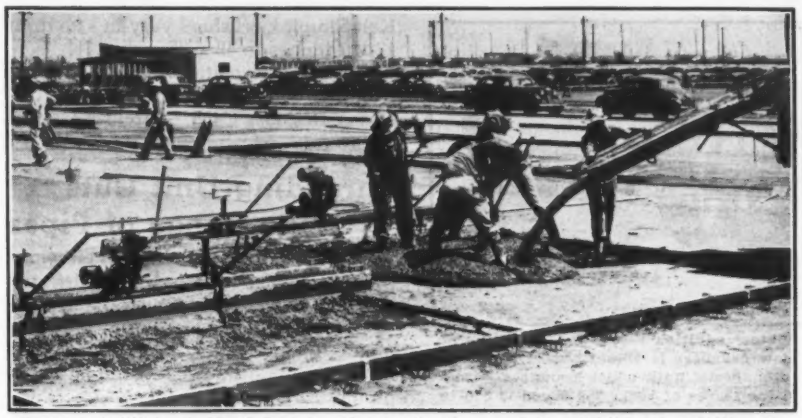
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.

Contractors' Wheelbarrows

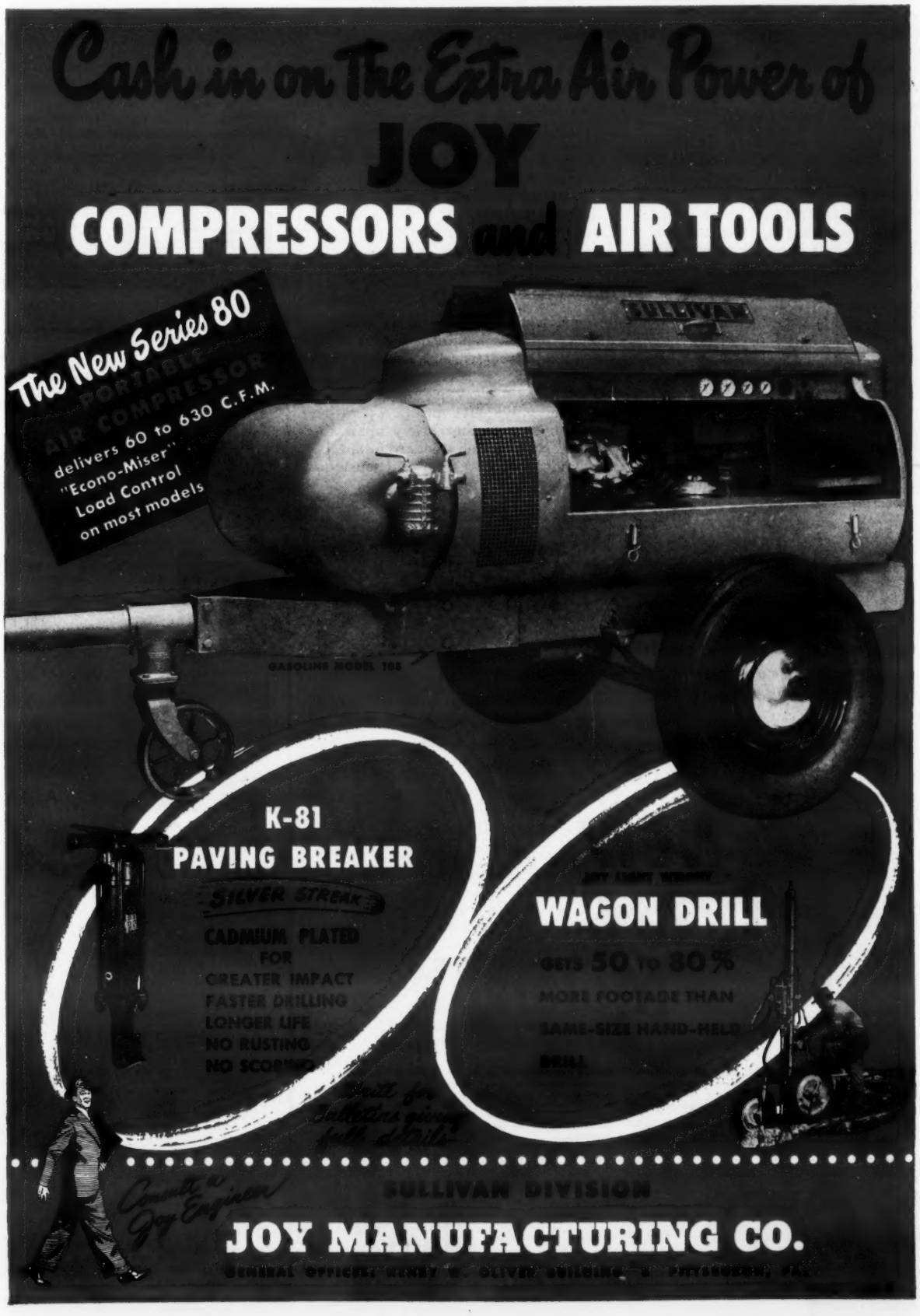
A folder showing its line of wheelbarrows for use by contractors has been prepared by The American Steel Scraper Co., Sidney, Ohio. These units can be furnished with pneumatic or steel wheels. The line includes the American No. 1 DeLuxe concrete barrow, the No. 1 DeLuxe heavy-duty industrial barrow, the contractors' and industrial all-steel general-purpose barrow, and the contractors' general-purpose barrow.

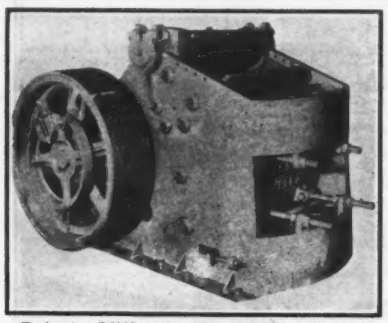
Bulletin No. 11 pictures each of these models, describes the materials of which they are made, and gives other specifications such as capacity, dimensions, and code words for ordering.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 55.



Burgess Whitehead, West Los Angeles contractor, used two Whiteman rodding machines in pouring a 158,000-square-foot concrete aircraft apron at the North American Aviation Plant in Englewood, Calif. It is reported that 18,000 square feet of concrete slab, 25 feet wide, was poured and finished per day.





Latest addition to the Kue-Ken line of jaw crushers is this all-steel contractor's special unit, which produces ¾ and 1-inch sizes of rock. Its speed is 350 to 365 rpm, and its capacity is said to be 40 to 60 tons per hour. It weighs 16,500 pounds.

Lightweight Crusher Yields 1-Inch Stone

A rock crusher designed to produce ¾ or 1-inch rock has been added to the line of crushers made by the Straub Mfg. Co., 532 Chestnut St., Oakland, Calif. This crusher called the Contractors' Special, can be furnished with jaw openings of 36 x 10 or 36 x 12 inches. It employs the patented Kue-Ken principle of crushing without rubbing.

All the operating mechanism is enclosed in a dust-tight and oil-tight housing. The crusher is said to require lubrication only once every six months. The hinge pin is sealed in oil. Large self-aligning SKF roller bearings in the side frames carry the eccentric shaft. The pitman is designed to be in compression and bears against the lower side of the shaft only. A safety device is built integral with the flywheel to protect the crusher against overloads or tramp iron. An automatic pressure switch is said to stop the crusher motor or engine if oil pressure drops below standard.

Capacity of this crusher is 40 to 50 tons per hour of ¾-inch rock or 50 to 60 tons per hour of 1-inch rock. Speed of the unit is 350 to 365 rpm. The maximum hp requirement, according to the manufacturer, is 40. Weight of the crusher is 16,500 pounds. Other Kue-Ken Simplex crushers vary in size from 12 x 7 inches to 42 x 25 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 1.

Threading Unit Cuts Wide Range of Pipes

A portable electrically driven pipe-threading machine is made by the American Die & Tool Co., 2nd and Buttonwood Sts., Reading, Pa. The 1948 Model Red-E-Haul is designed specially for installation and maintenance of all piping from ½ to 2 inches in size. Auxiliary equipment is available for extending this range from ⅛ to 12-inch sizes.

According to the manufacturer, the Red-E-Haul will cut, chamfer, ream, and thread pipe in the ½ to 2-inch range without changing dies. The flip of a lever is said to select the size instantly with the Double Quick die head, standard equipment on the machine. An automatic stop is used to open the dies after standard-length pipe threads are cut; but any length of thread may be cut.

The switch for the 1-hp motor incorporates a double electric outlet for lights and small power tools. Built-in safety features include chuck, wrench ejector, electrical overload protection, and automatic power-pump coolant system. For convenience and speed in applying fittings, this machine has a built-in tool tray and handy dope cup.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 29.

Machinery for Dams, Locks

A pictorial bulletin covering lock and dam equipment has been prepared by the Foote Bros. Gear & Machine Corp., 4545 So. Western Blvd., Chicago 9, Ill. It contains 12 pages of information on gate and valve lifts, bridge operating equipment, and other heavy operating machinery involving standard or special mechanical drive equipment custom-built to specifications.

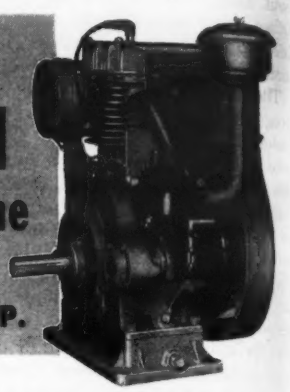
The catalog shows photographs of projects in which Foote equipment has been installed. It includes also large sectional pictures of the equipment itself.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 61.

Euclid Dealer in Arizona

The State Tractor & Equipment Co. of Phoenix has been appointed distributor for The Euclid Road Machinery Co. The appointment includes the entire state of Arizona with the exception of Navajo, Apache, and Mohave counties.

This HEAVY-DUTY WISCONSIN Air-Cooled Engine IS AVAILABLE IN 4 SIZES . . . 4 TO 9 H. P.

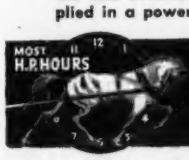


Illustrated above is the Models AEH to AHH series of 4-cycle single cylinder Wisconsin Air-Cooled Standard Engines, to which the following specifications apply:

MODEL	AEH	AFH	AGH	AHH
Bore	3"	3¼"	3½"	3⅝"
Stroke	3¼"	4"	4"	4"
Cu. in. Displ.	23	33.2	38.5	41.3
Hp. Range	4-6	5-7	6-8.5	7-9
Weight	130 lbs.	180 lbs.	175 lbs.	180 lbs.

If your equipment calls for an engine within the above power range, it will pay you to give serious consideration to the Wisconsin line . . . noted for rugged, heavy-duty serviceability and thorough-going dependability.

In addition to the engines listed above Wisconsin 4-cycle single cylinder engines are also available in 2 to 4 hp. sizes, and V-type 4-cylinder engines can be supplied in a power range of 13 to 30 hp. Detailed data furnished on request.



WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

IN TODAY'S MATERIALS HANDLING SPOTLIGHT

the NEW... COMET MOTOTRUK

Pat. Pending

MOTORIZED HAND TRUCK

Whenever production costs need trimming, today's emphasis is on reducing materials handling costs. The New Comet MOTOTRUK enables one man to do more work in less time where materials handling previously required manual hand-trucking. MOTOTRUK eliminates the need of helpers as boosters on steeply inclined ramps or over rough surfaces.

Operator merely balances and steers the truck as the motor does the work. Loads up to 1500 pounds easily moved up short 20 per cent grades; up to 2000 pounds for level hauling. Dock superintendents praise its versatility. Learn how your individual materials handling costs can be greatly reduced. Mail the coupon below.

ONLY $269.50 FOB MINNEAPOLIS

COMET MANUFACTURING CO.
9253 Nicollet Ave., Minneapolis, Minn.
Gentlemen:
Please send me complete information on the new Comet Mototruk.
NAME
ADDRESS
CITY STATE

MAIL TODAY!

SYNTRON
"Pulsating Electromagnet"

CONCRETE FORM VIBRATORS

with quick-acting vise clamp

SPEED UP PLACING AND SETTING

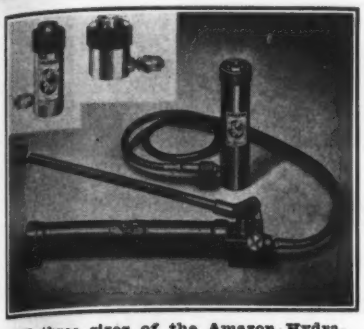
3,600 powerful, pulsating vibrations per minute eliminate hand rodding and spading—flow concrete into difficult, hard-to-get-at places—eliminate voids and pockets.

Applied to thin wall forms, pipe forms, etc.

Also available are flexible shaft models, powered by either electric motor or gas engine drives, with shaft lengths up to 36 ft.

Write for catalog folder.

SYNTRON CO.
227 Lexington, Homer City, Pa.



All three sizes of the Amazon Hydra-Pull ram and pump unit shown here have a 10-ton capacity.

Ram and Pump Units Made in Three Sizes

A hydraulic ram and pump unit is available from the Sunset Equipment Distributors, 1813 W. 11th St., Los Angeles 6, Calif. It is designed to apply a controlled force for direct pulling, pushing, lifting, clamping, bending, straightening, pressing, or assembling operations. Special ease of operation is said to accrue through the use of safety hose which permits the ram to be entirely separated from the pump.

The Amazon Hydra-Pull has a triple-sleeve ram with an open center. According to the manufacturer, the use of this triple-sleeve design eliminates all tendency of the ram to wobble, even when fully extended. Hand-operated, all controls are located on the pump. The flexible hose carries oil, under high pressure, to the ram, causing the plunger to rise.

The Hydra-Pull is made with rams which stand 3, 5⅜, or 11 inches high. The 11-inch unit has a 6-inch lift and a load capacity of 10 tons. Attachments are available which thread onto the ram and extend the lift to 8 feet. The 5⅜-inch unit has a lift of 2 inches and a capacity of 10 tons. The 3-inch unit will lift a load of 10 tons to a height of one inch.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 20.

Decals Identify Gear

One way to help prevent the loss of small tools and to identify your heavy equipment is to use decalcomanias. Advantages claimed for this system of marking are that decals are permanent, easy to apply and economical.

One company making them is the Criterion Decalcomania Co., Inc., 7 E. 42nd St., New York 17, N. Y. The firm makes slide-off transfer nameplates, transfer lettering and trade marks for trucks, and other designs to order.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

Tractor Lubrication Spex

A new pamphlet listing approved lubricating oils and greases for use with its track-type tractors has been put out by the Tractor Division of the Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. This pamphlet will act as an aid in purchasing lubricants for A-C equipment. It covers oil for transmissions and final drives, and greases for truck wheels, support rollers, and track idlers.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 77.

Bin and Batch Equipment

A line of specialized construction equipment is the subject of a bulletin available from the Butler Bin Co., Waukesha, Wis. Bulletin No. 260 describes ready-mixed-concrete plants, concrete-products plants, central-mixing plants, batching plants, portable bulk-cement plants, sand and gravel plants, storage bins, portable concrete hoppers, industrial installations, weighing batchers, cement elevators, and the Butler Carscoop.

The bulletin shows photographs of all these units in various on-the-job installations. It points out their features and capacities. It also contains a list of Butler distributors, and a list of other bulletins available from the company.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 59.

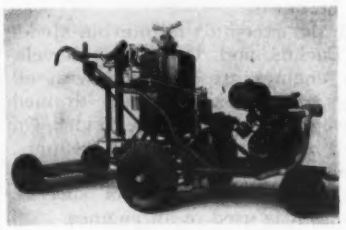
Engineers' Slide Rule

A 12-inch slide rule is made by Pickett & Eckel, Inc., 5 So. Wabash Ave., Chicago 3, Ill. Known as a Deci. log log slide rule, it is made of a magnesium alloy with a washable plastic-surface.

The scales on the front of the rule are arranged in such a manner that each setting of the hairline gives its square root, cube root, and logarithm. On the back, it has an expanded log log scale to give more accurate visual readings. It has the usual scales for mathematical computations; for finding numbers and their reciprocals; logarithms and cologarithms to two bases; and trigonometric functions.

It is said that the patented Deci-Point design automatically locates decimal points. A legend tells which scale to read when raising to powers. The rule comes complete with a carrying case and instruction manual.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 96.



All-Purpose Striper Solves Zone-Marking Problem

Self-propelled and completely self-contained, designed to meet the needs of state and county highway departments, municipalities and airports for accurate high speed striping.

Clean-cut, attractive lines are assured with K-C Air Curtains. Air actuated traction up to 5 MPH with a trailer for the operator. Truck mounted and other models available for all requirements. Write for folder.

KELLY-CRESWELL CO., Xenia, Ohio

Here's **NEW BEAUTY** *That Helps Me Sell Concrete!*

"Yes, Sir . . . on every trip, the new 1947 Smith-Mobile's handsome appearance helps advertise my business . . . virtually acts as my concrete salesman."

Smith-Mobile's beauty is achieved largely by functional styling. Mixer engine, transmission, water pump, valve system and all moving parts are completely enclosed in a streamlined housing. And these improved Smith-Mobiles are easy to keep handsome . . . easy to "hose off" between trips. The roomy charging chute prevents spilling of dry aggregates or cement. And the perfected drum closing door seals batch in drum . . . keeps concrete from seeping out in transit.

Improved performance goes along with new beauty. Drums are larger, yet overall weight is materially decreased. Dual water injection system prevents freezing in cold weather. Direct-connected motor has 3-point suspension. Simple, lightweight transmission is foolproof. Drum rides on Timken Roller Bearings in rubber-cushioned case.

Four popular sizes. The demand for these improved Smith-Mobiles is still much greater than the supply. But deliveries are being stepped up by greatly increased production. Get the complete Smith-Mobile story — today!

New Bulletin Just Off the Press!
Gives you all the facts, dimensions and specifications of the improved SMITH-MOBILE models. If you haven't already received yours, be sure to ask for a copy.

THE T. L. SMITH COMPANY, 2857 N. 32nd Street, Milwaukee 10, Wisconsin, U. S. A.

SMITH MOBILE

The Original High Discharge Truck Mixer and Agitator

A 5162-1P

Granby Equipment Serviced on Job

Mobile Fuel and Grease Unit, Together With Two Quonset Repair Shops, Keep Machines Moving

✦EQUIPMENT operating two 8-hour shifts each day under extremely rough conditions of work is being kept on the job at Granby Dam (see page 2) by a standard but well organized system of maintenance and repair in the field.

This is no small job. The Granby equipment fleet is composed of 24 bottom-dump Euclids, 8 end-dump Euclids, 9 Caterpillar D8's, 2 Caterpillar D7's, 3 big Lima 1201 machines, a Lima 802, a Bucyrus-Erie Model 54-B shovel, a Lorain Moto-Crane, and a Bay City crawler crane. There is also the screening plant. Automotive equipment includes at least 28 pick-up trucks and light flat-racks. There are in addition a number of auxiliary pieces of construction equipment, such as compressors, drills, pumps, and tank trucks.

Feature of the regular preventive maintenance routine is a mobile lubrication and fuel unit, which makes rounds at least once each day and frequently once each 8-hour shift. There is also available in one of the shops both fueling and lubrication service for the rigs which may stop by on their trips.

Daily Maintenance Important

Every piece of equipment brought in to Granby Dam was new when it arrived, and the management considers it very important that all units be kept up to the peak of mechanical excellence. This policy will guarantee that the equipment can finish the big $6,000,000 project and still have a high salvage value when the work is completed two years hence.

The manufacturer's recommendations regarding lubrication are being followed religiously.

Once every day shift all units of equipment receive a thorough lubrication in strict accordance with maintenance manuals put out by their manufacturers. Copies of these manuals are kept in the Master Mechanic's office and, in many cases, on the equipment.

When a piece of equipment goes on a type of work harder than its ordinary duty, the grease monkeys pay special attention to lubrication and service. A few track rollers have failed, but not because good grease was not used often. They have failed because of water, of mud and slop which literally washed the grease away about as fast as it could be put in.

With the exception of four big Model 3TD Euclids and the Lima shovels, whose engines are equipped with oil refiners, all crankcase oil is drained each week after 96 hours of service. On the big units equipped with refiners, changes are made once every three weeks with a great deal of success. Kendall oil is used in all engines.

Shop Repairs Also Available

The center of all maintenance consists of two Quonset-type huts 40 x 100 feet long, located on the haul road between the screening plant and the dam. Any kind of mechanical doctoring from minor operating repairs to a full-scale motor overhaul is available there. There is plenty of space in front of the Quonsets and behind them for mechanics to work.

The first Quonset consists of a parts room and office for Harry Pawpaw, the Master Mechanic; a main repair floor for the repair of heavy equipment; and a welding shop. This hut is insulated, heated by two stoves and a hot-water system. Last winter when the temperature at Granby Dam dropped to 41 degrees below zero a key force of mechanics stayed on and worked through the winter on equipment.

The main repair hut has several long workbenches and the following equipment:

1 Mine & Smelter Supply Co. bit grinder
1 Buffalo forge
1 Royersford 21-inch drill press
1 Miller-Knuth power hack saw
1 heavy-duty grinder
1 Rodgers hydraulic press
1 Sioux heavy-duty bench grinder
1 Walker truck jack
1 Yale spur-geared 2-ton hoist
1 Sioux heavy-duty drill
1 Delco-driven air compressor
1 Raybestos brake machine
1 Sioux valve-grinding machine
2 heating stoves
1 Lincoln arc welder
1 oxyacetylene set
Bench vises, heavy-duty small tools, etc.

The other Quonset is used as a storage room for wire rope, lubricating oil and grease, tires, tubes, springs, and miscellaneous small parts. It also houses a Tungar battery charger. Complete lubrication service is available in this hut, and Euclids can come in out of the weather to be worked over.

Granby Constructors Photo

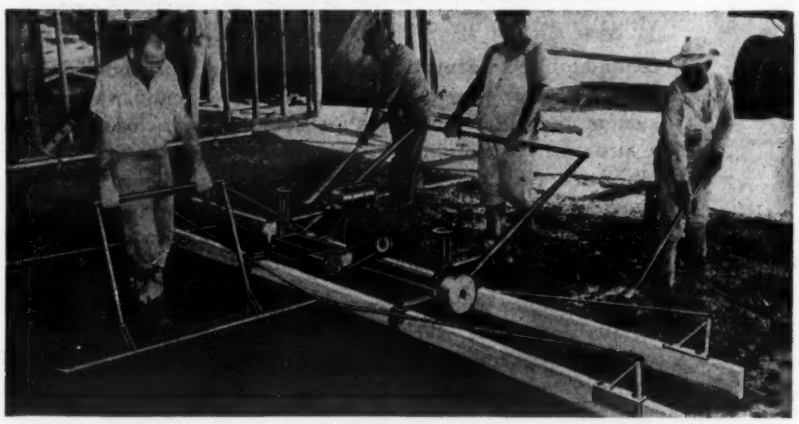
The center of all maintenance at Granby Dam consists of these two Quonset-type huts 40 x 100 feet long. One houses the main repair floor; the other is used largely for storage and lubrication service.

A fairly complete stock of repair parts is kept in the numbered bins in the shop, but Denver distributors are only 100 miles away in case of serious breakdown. It is not the policy of Granby Constructors to try to manufacture spare parts in the shop. While a few emergency parts have been made up by the blacksmith, all standard parts are being replaced through the Denver equipment distributors or the nearest branch office.

Almost All Ailments Treated

Most heavy repairs are performed by skilled mechanics there on the job.

(Concluded on next page)



Save Time and Money with a

***Whiteman* RODDING MACHINE**

This portable Rodding Machine produces better concrete . . . rods the slab to a perfect level, compacted . . . ready for floating and finishing. Model "RS", for slabs 3 to 10 ft. wide. Also in Model 44, for slabs 10 to 20 ft. wide. Hand Grill Tamper at left, for tamping down larger aggregate, eliminates use of dry topping.

Write for details and name of nearest distributor

Whiteman CONCRETE EQUIPMENT
WHITEMAN MFG. CO.
3249 Casitas Ave., Los Angeles 26, California

It's Naylor Light-weight Pipe

When complete, this line will be used to wash away a mountain of sand. Naylor Lockseam Spiralweld Pipe is at its best on jobs like these. Sizes from 4 to 30 inches in diameter, with all types of fittings and connections.

Sizes from 4" to 30" in diameter with fittings and connections to meet customers' specifications.

Naylor

NAYLOR PIPE COMPANY
1270 East 92nd Street • Chicago 19, Illinois
New York Office: 350 Madison Avenue • New York 17, N. Y.

Granby Constructors Photo
Rain and snow can turn the material at Granby Dam to slop and mud, as this photo of a Caterpillar D8 with a Caterpillar bulldozer blade shows. If equipment fails, it is not because good grease is not used often. It is because the mud washes away grease as fast as it can be put in.

working under the supervision of big, genial Harry Pawpaw, experienced mechanical wizard who diagnoses, without a great deal of fanfare, the multitude of ills besetting such a variety of machines.

But one job last winter was a little too big to be done at Granby: a number of Cummins diesel engines from the Euclids were removed and shipped to the Cummins factory so the water-circulating ports in the engine block might be bored out larger.

Harry Pawpaw will tell you there is some kind of direct ratio between the weather and the number of minor repairs he does. Equipment that operates perfectly for days will suddenly develop windshield-wiper trouble or something equally minor when rain and snow begin to fall.

"We cure that by letting the fire go out in the big stove over there in the corner," he says, laughing.

However, when a piece of equipment really needs attention, it is Pawpaw's policy to fix it up without minimizing the seriousness of the breakdown. If a Euclid comes by the front door and its operator yells, "Hey, I can't get my front dump door to open", the Master Mechanic walks out to look the situation over and then assigns one of his men to fix it up.

Bit grinding, blacksmith work, and welding are three activities which never stop around the shop. Because hard rock predominates at Granby Dam, a great amount of hard-facing is always under way on dipper teeth, buckets, and dozer shoes. Ranite B electric welding rod is used to hard-face the dipper teeth. Strangely enough, the mechanics have found that mild-steel points covered with Ranite B hard-facing last longer than high-strength-steel points covered with the same material; the latter show a tendency to break after about four hard-facings.

Routine attention, good mechanical doctoring, the best fuel and lubricants, and a Master Mechanic and operators who like to see machines in tip-top shape are in large measure responsible for the good condition of equipment at Granby Dam.

Welding-Fume Exhauster

A portable welding-fume exhauster, for use in welding operations where stationary ventilating systems are unavailable or impractical, is described in a new bulletin put out by the Mine Safety Appliances Co., Braddock, Thomas, and Meade Sts., Pittsburgh 8, Pa. The manufacturer recommends it especially for use in cramped or confined quarters, or where the welder must move from place to place in enclosed areas.

The bulletin contains a drawing of the interior construction of the exhauster, showing the location of settling chamber, spark arrester, filter tubes, fans, motor, and exhaust ports. Bulletin No. CU-1 also describes the operation and functions of these various parts.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 71.

Porous Wax Aids in Tree Transplanting

An aid to landscape architects has been developed by The Dow Chemical Co., Midland, Mich. It is a wax preparation for use in coating trees and shrubs prior to transplanting. Known as Dowax, it is said to extend the transplanting season, retard evaporation, conserve vital moisture, eliminate wrapping except on thin-bark varieties, and to discourage borer attacks.

Dowax is an emulsified wax preparation containing bentonite. The bentonite prevents flowing in hot weather and possible penetration into the plant tissue; it also provides porosity to allow the plants to breathe. The solution is applied in a wet state by spraying or dipping. As the bentonite dries, it shrinks, leaving small openings in the wax film.

Dowax is put up in 200-pound drums, 5 or 10-gallon drums, and 1-gallon cans packed 6 to a case. It weighs 7 pounds per gallon, and recommended dilution is one part Dowax to three parts water.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 23.

Goodyear Appoints Rasor

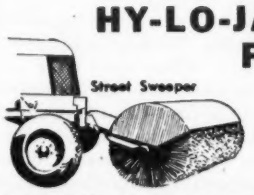
Louis W. Rasor has been appointed District Sales Manager of the Goodyear Tire & Rubber Co.'s Mechanical Goods Division, at Charlotte, N. C. This district covers North and South Carolina, and parts of Virginia and West Virginia. Rasor succeeds Richard G. Abbott, who has been named District Manager at Los Angeles.

Let HYDRAULICS lift your equipment

use the **MONARCH**

HY-LO-JACK FAN BELT DRIVEN

POWER HYDRAULIC CONTROL



Lifts equipment ten times faster than hand pump. Easy installation on new or existing equipment. Hundreds of applications, such as Snow Plows, Sweepers, Power Mowers, etc. Priced for the most conservative budget.

WRITE FOR CIRCULAR H.75

"QUALITY MACHINERY SINCE 1856"

MONARCH ROAD MACHINERY COMPANY. 327-329 Front Ave., N.W., Grand Rapids 4, Michigan

Here's the

New Moil Point

Designed to Cut Costs!

Different kinds of steel in the shank and point give extra strength and durability.

More and more contractors are discovering the new ROCKBIT detachable moil point will cut their job time and costs. This new moil point will stay sharp longer than ordinary moil points by more than 7 to 1. Furthermore, it will break up to 50% more concrete per man hour.

Such performance records are the result of a new principle in moil point design. The ROCKBIT detachable moil point is made in two parts: a shank of "tough" steel for long life, and a point of "hard" steel for cutting ability. When the point dulls it can be detached and a new point placed on the same shank. The old point can be reground by any laborer, eliminating old-fashioned blacksmith resharpening.

Test the new ROCKBIT detachable moil point on your next job. Prove for yourself it will cut your job time and costs. If your distributor cannot supply you, write direct to our nearest plant.

DEALERS ATTENTION: Immediate delivery from stock on all "ROCKBIT" Pneumatic Accessory Tools. Write for complete catalog and price list.

ROCKBIT SALES & SERVICE CO.
2514 E. Cumberland Street, Philadelphia 25, Penna.
350 Depot Street, Asheville, N.C.

ROCKBIT
SALES AND SERVICE CO.

Farm land near El Centro, Calif., is re-leveled preparatory to flood irrigation. Contractors Bratton & Sturges of El Centro used Caterpillar diesel DW10 rubber-tired tractors with LaPlant-Choate scrapers for heavy leveling. They used this Be-Ge 18-inch scraper towed by a D7 track-type tractor for the finish work.

Conveyor-Belt Styles To Suit Varied Needs

Belt conveyors and elevators provide a rapid and efficient means of handling a great number of construction materials. A complete line of this type of equipment is offered to the construction industry by the Thermoid Co., 400 Whitehead Road, Trenton, N.J. The belts are designed to handle all types of materials—light or heavy, soft or abrasive, hot or cold, wet or dry, uniform or non-uniform, etc.

Thermoid recommends its neoprene belts for any use where oily conditions exist. The neoprene line consists of three groups based on the weight of the fabric used in the carcass. These are: (1) Silver Hard 35-ounce duck, (2) 32-ounce belt duck, and (3) 28-ounce belt duck.

All Thermoid belts are said to be made with straight-laid plies, bonded with a flexible and tight-gripping skim layer of rubber between the strength high-abrasion-resistant rubber covers.

The No. 400A conveyor belting is made of plies of 32-ounce belt duck. Separation-pull strength averages from 16 to 19 pounds. Blended natural and synthetic-rubber covers of 1,700 to 2,200-psi tensile strength surround the carcass. The manufacturer recommends it where a belt of 30 inches wide or over is required. The No. 400C is designed for use with moderately abrasive materials of small size, such as sand and gravel. Thermoid also recommends it for use in portable conveyors. Separation strength is 12 to 15 pounds, while the tensile strength is 800 to 1,000 psi.

The No. 450A is designed for handling bulk materials on all conveyors of 30 inches in width and under, except where severe loading conditions and high tensions require a heavier pull. Separation strength is 16 to 19 pounds; tensile strength is 1,700 to 2,200 psi. No. 450C is designed for light, slightly abrasive materials. Separation strength is 12 to 15 pounds; tensile strength is 800 to 1,000 psi.

In addition to these, the Thermoid line includes other belts designed for virtually every type of conveyor application.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 93.

Data on Versatile Shovel

A catalog listing the features of its Model No. 105 power-shovel unit is available from the General Excavator Co., 220 Rose St., Marion, Ohio. Features stressed in Bulletin No. G-4610 are the shovel's mobility, versatility, and ease of operation.

Consisting mainly of pictures, the catalog shows Model 105 on many different projects in use as a shovel, clamshell, dragline, crane, and backhoe. It shows the 105 at work on soft, spongy ground, on hilly terrain, and in difficult operating positions. Other pictures are used to show its wide range of uses: for excavating, construction, loading, etc.

Copies of this literature may be obtained from the company, or use the enclosed Request Card. Circle No. 72.

Construction Inspectors Trained for Two Months

One of the many innovations which State Highway Director H. E. Bailey has made in Oklahoma's new highway program is a training school for construction inspectors.

It consists of two weeks of lectures, classwork, and actual work in materials inspection during the day—with study periods at night. When they have finished the two-week course, inspectors receive 30 days of first-hand experience in road work. They then attend training school for two more weeks. When they have successfully completed their course, they are qualified to inspect and oversee assigned portions of highway construction and maintenance, and to deal with materials testing, among other duties.

Carl R. Reid, engineer of training and former materials engineer, is supervising the program. He believes it to be the only one of its kind in the country today. The State plans to expand the program to include training for members of all the departments.

Toncan Assn. Names Snyder

Hubert E. Snyder has been named Managing Director of the Toncan Culvert Manufacturers Association. He succeeds P. H. Pickering who has resigned. The Association is composed of manufacturers and engineers who use Toncan iron in drainage structures. Its new offices are located at Room 909 in the Midland Bldg., Cleveland, Ohio.

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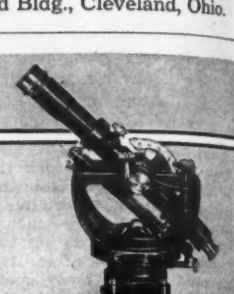

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Manufacturers of Instruments for Engineers, Surveyors and Builders

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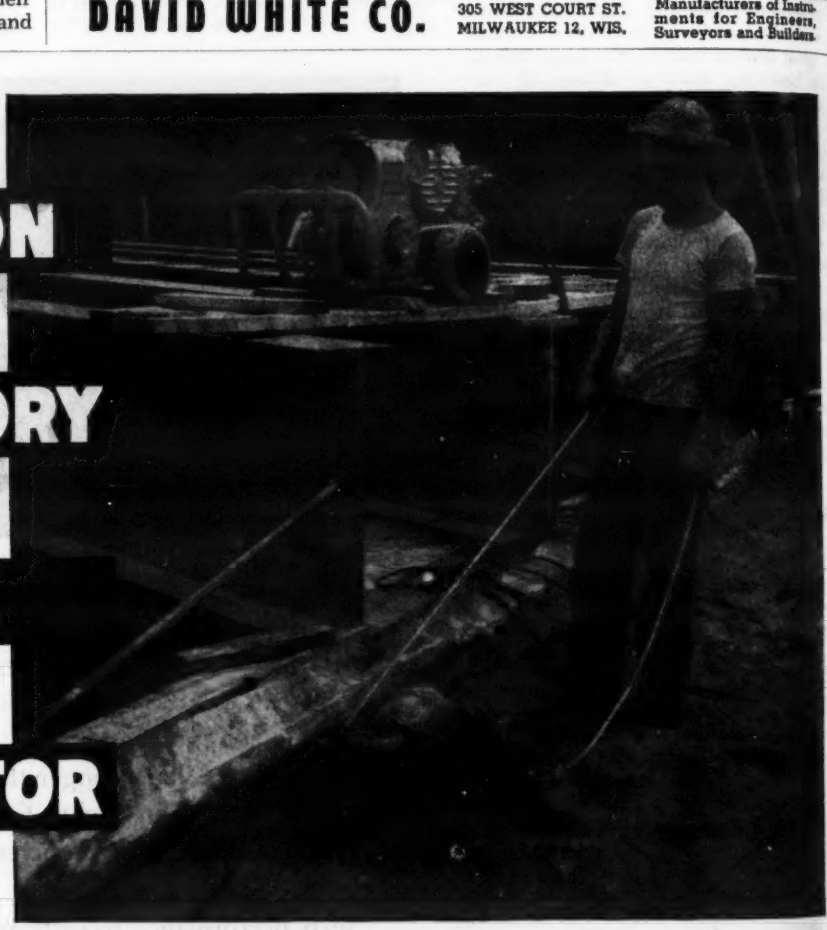

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This remarkable new machine will give you up to 95% of MAXIMUM DENSITY (in granular soils) IN A SINGLE PASS — and do it in less than one-fifth of the time the job may be attempted with other equipment! Eliminates long delays in paving and paving settlement; assures solid sub-base for factory concrete floors on which heavy machinery is to be mounted.

THE MODEL M-2 PORTABLE POWER PLANT (see photo) usually furnished to operate Jackson Soil Compactors generates both single-phase and 3-phase 110 volt, 60 cycle AC. May be used for lights and power tools as well as running the Compactors. Will operate 4 Compactors simultaneously. JACKSON Power Plants are known throughout the nation for their outstanding reliability.

Note these features: 1. PROPELS ITSELF AT 6' to 8' PER MINUTE . . . under normal conditions. Operator has nothing to lift or drop; he simply guides it.

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3. WEIGHS ONLY 150 LBS. Two men can easily throw it on a truck or carry it to nearby locations.

4. TIME-TESTED VIBRATORY MOTOR — used on our standard equipment for 25 years. Operates on 3-phase, 110 volt, 60 cycle AC.

It's the ideal soil compactor for those areas inaccessible to the large, tractor drawn equipment. With a change of bases, it is also highly effective on coarse gravel and rock, and for smoothing and compacting blacktop. What "pre-shrinking" is to the cotton shirt, vibrating with the Jackson Compactor is to bridge approaches and similar fills. Write, NOW, for the complete facts!

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Mich.

Five Pavers Build 10,000-Foot Runway

(*Continued from page 1*)

on platforms so that the tank trucks can pull beneath and get loaded by gravity.

It should be added, however, that the high water table, while supplying adequate water for the concrete, was troublesome in the grading operations.

The Mix

The mix design is based on the material that is available from the near-by gravel pit. But as the supply of coarse 3-inch gravel is limited, more of the ¾ and 1½-inch sizes are used than the larger grade. The gradation specifications of the three sizes of gravel and the sand are as follows:

Sieve Size	Per Cent Passing			
	1½-3-inch	¾-1½-inch	No. 4-¾-inch	Sand
4-inch	100	....	....	....
3-inch	90-100	....	....	....
2-inch	20-55	100	....	....
1½-inch	0-10	90-100	....	....
1-inch	0-5	20-45	100	....
¾-inch	....	0-10	90-100	....
⅜-inch	....	0-5	30-55	....
No. 4	....	....	0-5	95-100
No. 8	....	....	....	80-90
No. 16	....	....	....	55-75
No. 30	....	....	....	30-60
No. 50	....	....	....	12-30
No. 100	....	....	....	3½-10

The weights of the materials as they go into a typical 37.4-cubic-foot batch, before adjusting for moisture in the aggregate, are as follows:

Cement	716 lbs.
Sand	1,373 lbs.
3-inch gravel	751 lbs.
1½-inch gravel	1,404 lbs.
¾-inch gravel	1,110 lbs.
Water (added)	309 lbs.
Total	5,663 lbs.

The gravel used has a specific gravity of 2.68. The mix represents a ratio of 1 : 1.95 : 4.56 and results in a slump of from 1 to 1½ inches, using 4.87 gallons of water to the bag of cement. The water-cement ratio is 0.65; the mix takes 5.5 bags of cement to the yard.

To give an air content of 3.0 to 6.0 per cent (4.5 + or — 1.5 per cent) to the concrete, Darex AEA air-entraining agent is added at the pavers at the rate of 1.7 ounces per bag of cement. This amounts to nearly 13 ounces for each batch. On top of each paver are two 55-gallon drums of the air-entraining agent and an automatic dispensing pump. This pump shoots the exact amount into the first drum of the Twin-batch paver every time the skip is raised. Batches take 1½ minutes to pass through the paver; they are mixed 39 seconds in the first drum and 40 seconds in the second, and 11 seconds are required to pass from one drum to the other.

C. & E. M. Photo

A Huber rubber-tired tractor maintainer handles Heltzel steel forms for Patterson Field paving. The scoop has been removed from the front-end loader, and the 8-foot pole boom and two hooks handle the specially designed 21 and 25-inch steel forms.

Fine-Grading and Forms

But before anything could be done with the concrete, each runway lane was brought to exact line and grade and the massive forms erected to receive the flow of batches. After the first 25-foot lane was poured, the motor graders had only to shape a 27-foot strip for the adjoining lane; the extra 2 feet was sufficient to take the single row of forms.

The form trench was cut with a Cleveland Formgrader, and a double string line, one above the other, was set on pins so that the high forms could be more easily brought into line. The specially designed and built Heltzel forms are 12 feet long, are made of steel 3/16 inch thick, and weigh 850 pounds each. They measure 25 inches deep on one side and 21 inches on the other so that they may be used for both

(*Continued on next page*)

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For all the facts, see your Rex Distributor or write for Bulletin No. 46-8. Chain Belt Company, 1666 W. Bruce St., Milwaukee 4, Wis.

CHAIN BELT COMPANY of MILWAUKEE

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

Five Pavers Build 10,000-Foot Runway

(*Continued from preceding page*)

runway and taxiway construction by simply reversing the sides.

Each form section is firmly anchored in place by 8 pins in two rows of 4 each. In the upper row 42-inch pins are used, while 24-inch pins suffice in the lower row. The pins are driven by a couple of Sullivan air hammers powered by a Track Air 105-cfm compressor mounted on a tractor. In all, 4,000 feet of forms are on the project, with about 1,000 feet of forms and grade usually in readiness ahead of the pavers.

At half the depth the forms are pierced by a row of eight holes, 4-inch diameter, on 18-inch centers. Into these holes fit 2½ x 24-inch dowel bars which weigh 33 pounds each, and are furnished by the Copperweld Steel Co. of Glassport, Pa. Some 141,000 dowels are needed.

The holes are purposely made larger than the diameter of the dowels so that the forms may be easily slipped off, leaving half the length of the dowel projecting from the concrete to form a tie with the adjoining lane. A special patented holder fits snugly around the bar in the hole, preventing any concrete or grout from escaping, and a wedge key locks the holder and dowel in a fixed position. When the forms are ready to be removed, the key is loosened, the holder or collar slides off from around the dowel, and the 12-foot steel section is quickly lifted from the side of the slab.

At the end of a day's run a construction joint is made, using two lengths of 12-foot forms and a special 1-foot section to make up the 25-foot width of lane. Dowels are placed in the joint, just as they are along the sides of the lane, to form a longitudinal tie with the next pour when work is resumed.

The contractor is using a large number of Oliver farm wagons, low-beds with rubber-tired wheels pulled usually by rubber-tired tractors or trucks, to haul the great quantity of materials used in a concrete-paving job. The wagons carry forms, dowels, steel-mesh reinforcing, joint materials, and light tools and equipment.

The forms are lifted from these wagons and set in place by a couple of Huber and Allis-Chalmers rubber-tired farm tractors with front-end loaders. The buckets were removed and the 8-foot pole used as a boom reinforced with angle-iron braces. At the end of the rig two hooks are quickly attached to the form sections, which are then transferred from the wagons to the form trench where they are pinned into position. These tractor-maintainers are also outfitted with a side-bar attachment for pulling the form pins 24 hours after a pour is completed. The forms are then loaded onto the wagons and pulled ahead for resetting.

Once the forms are securely pinned down to line and grade, a Cleveland subgrader is used to remove any high spots. The surplus material is shoveled over the side of the forms. The grade

(*Continued on next page*)

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For Safer LOWERING
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RATCHET LOWERING JACKS
For Contractors, Bridge and Road Builders, Truckers, Operators of Heavy Equipment
Use these single acting jacks for safe, sure work in lifting, lowering, pushing or pulling. Double lever sockets speed work in cramped quarters and in angular lifting. All models will lift full capacity on the toe or on the cap—a feature that only Simplex can give you.
Available in 10 models with capacities ranging from 5 to 35 tons, and lift from 7 to 18 inches. All have two-way standard lever socket except three largest models; these are available with any of three types of sockets. Delivered with lever included.
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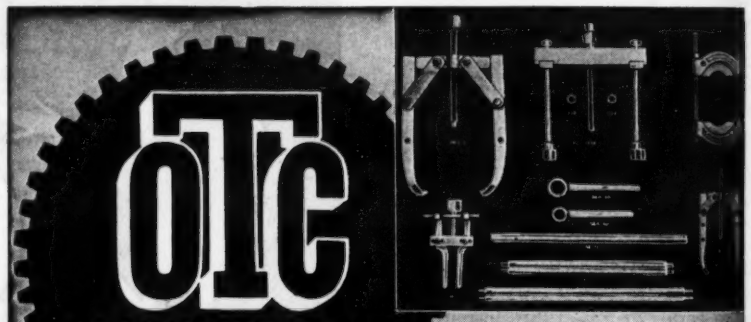

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MK-1007

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McKIERNAN-TERRY CORP.
Manufacturing Engineers
19 PARK ROW, NEW YORK 7, N. Y.

is carefully checked with a Cleveland scratch template and then rolled by a Huber 5-ton roller. The forms are oiled, the grade wet down if necessary, and all preparations to receive the concrete are completed.

Placing the Concrete

The two Koehring 34-E Twinbatch pavers, with 35-foot booms, work from the grade outside the forms, one behind the other. Tank trucks are parked alongside supplying the water for the mix. The first-in-line paver and the trucks with the wet batches place all the concrete up to within 4 inches of the top of the slab, at which level the steel-mesh reinforcing is added. The second paver places the concrete for the upper 4-inch lift. Ample space is available for the batch trucks to turn and back up to the paver skips as they dump their loads of cement and aggregate.

Once the first lane was poured, trucks used the concrete to ride on as they hauled two batches or 2.8 yards of mixed concrete, contained in their single compartments, from the central mixing plant to the forms. While the second lane was being paved, the wet-batch trucks either end-dumped the concrete off the edge of the pavement or backed out on a trailer which was pulled along between the form and the lane already poured. In this way the concrete batches were not all dumped on the one side which would have made the spreading a problem.

A Rogers heavy-duty trailer, 23 feet long, was pulled over the grade by a Ford truck. The bed of the trailer was slightly higher than the adjoining concrete pavement, but a ramp made of steel plates permitted the trucks to back out on it once they had maneuvered into position at right angles to the runway. The trailer carried a Cleveland scratch template in front so that the grade could be checked after its towing truck had passed. Along the side of the trailer where the concrete was dumped, steel side plates were hung reaching down to the level of the subgrade. These kept the concrete from being spread back under the trailer and getting ground into the dirt.

On subsequent lanes this method of concrete placing was improved upon with the construction of two dumping bridges to replace the trailer. Each bridge set-up consists of two 12-inch 53-pound H-beams spanning the 25-foot lanes on 10-foot centers. The beams ride on wheels, moving over the forms on one side and the edge of the concrete on the other. The bridge is floored over for two-thirds of the way so that the trucks can back out on it and dump down the outer third of the lane. Behind the bridge other trucks dump from the edge of the concrete as before. The bridge has wheel guards to stop the trucks at the proper line.

The trailer is pulled along on the other side of the lane in use, to assist the trucks in turning. This was done as a safety measure to furnish that extra width for the trucks to maneuver over until two lanes were finished; then it was no longer needed. The dumping bridge enables the concrete to be spotted more evenly over the subgrade and speeds up the spreading and finishing operations.

Finishing Operations

The concrete is spread evenly over the subgrade by a Blaw-Knox paddle-type spreader; it has a screed towards the rear which levels the material on a plane 4 inches below the top of forms. Across the rear of the spreader is an arm which can be raised or lowered supporting a 6-unit Viber internal gang electric vibrator rated at 9,600 rpm. The two outside vibrators are 2 feet within the slab so as to clear the dowels along the sides; the others are spaced a trifle over 4 feet on centers.

After this lower course of concrete is vibrated, the mesh reinforcement, supplied by the Government, is added. The mat is composed of 3-inch squares weighing 100 pounds per 100 square feet; it is laid in strips, 24 feet 6 inches x 7 feet 3 inches. Four men lay the mats in place, treading on the one just laid in order to keep off the concrete as much as possible.

C. & E. M. Photo

At the central concrete-mixing plant about ½ mile from the batch plant, two Koehring 34-E Twinbatch pavers mix concrete and dump wet batches into trucks which carry it to the runway forms at Patterson Field.

The second paver then drops batches over the mesh, filling the forms to the top. This upper 4 inches of concrete is then vibrated by two Jackson vibrating tubes carried on the front end of a Jaeger-Lakewood finishing machine. The tubes extend the full width of the lane and can be raised or lowered to any position. The concrete is spread and leveled by the two screeds on the finishing machine. Behind the machine comes another Jaeger-Lakewood finisher, also with double screeds to complete the mechanical finishing. The tube vibrators on this unit are not used, however.

Behind the finishers comes a Flex-Plane machine which cuts a transverse groove across the concrete every 28 feet for the contraction joints. The incision goes below the mesh and is 5 inches deep x ½-inch wide. In this slot, five pieces 5 inches long of Philip Carey premolded bituminous joint material are installed, filling up the bottom 3 inches of the cut to the full ½-inch width. A metal cap goes over each length of mastic with a 3-inch lip on one side and a 4-inch lip on the other. With the cap in place the full depth of the groove is completely filled.

At first, any longitudinal adjustments

(*Continued on next page*)

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Five Pavers Build 10,000-Foot Runway

(*Continued from preceding page*)

were made by finishers with long-handled 10-foot straight-edges and long-handled floats working from both sides of the slab (a Koehring bullfloat is now in use). They carried along a small tank of water to apply a light fog spray to the concrete which is a help to the finishers, especially during hot weather. The water tank has a ¼-inch pipe and nozzle for the outlet. Then comes a bridge pulling a 3-foot-long burlap drag over the surface to remove any laitance from the top of the concrete.

As the concrete sets up, the finishers remove the caps from the contraction joints and edge them with a ½-inch-radius tool. They do this from a work bridge, and also slip a piece of wood into the upper part of the joint to remain there until the slab attains a more permanent set.

The last bridge carries the machine for applying the Tru-Cure membrane compound for curing the concrete. Riding on rails back and forth across the bridge is a Truscon Laboratories spraying unit with a W. G. Chausse pump. Protected by a hood to keep the liquid from blowing about in a wind, the spray bar covers a 5-foot strip of concrete with the compound at every pass. After the operator completes a pass, he winds the bridge ahead on the form rails, and pushes the spray unit back to the other end of the bridge, applying the compound as he goes.

Rubberized-Asphaltic Joints

After the concrete has aged for 5 days, the open slot at the top of the contraction joints is poured. This aging period is required so that the workers will not crack the thin bond that is formed over the concrete by the curing compound. It is this bond or film that seals in the water and effects the cure. Finishers remove the wooden strips from the joints the same day the concrete is poured, and in the interim the slots become somewhat filled up with dirt and debris. They are cleaned out with chisels and compressed-air hose, and then filled with Careylastic rubberized-asphaltic joint material.

Careylastic can be used only at temperatures of between 375 and 400 degrees F. This means that the material has to be uniformly heated in oil-bath double-boiler bituminous kettles. One White and two Aeroil kettles were brought to the job, the White unit heating the oil by kerosene and the Aeroils using bottled gas. In order to get the compound to the right temperature, the oil has to be heated to between 500 and 550 degrees F for 4 or 5 hours and held there. Then the compound is drawn off into hand kettles and the 2-inch-deep slot is filled in two pourings of about 1-inch each. Two lifts were found best because of a certain amount of shrinkage that occurs.

C. & E. M. Photo

Two Koehring 34-E Twinbatch pavers, working from the subgrade on the same side of the forms, place concrete in the adjoining lane at Patterson Field. Three other pavers were set up at the central plant.

Observing the temperature limits is important, for under 375 degrees F the material will not flow properly, and over 400 degrees F the compound becomes too thin and runs out of the joints. The rubberized filler is intended to eliminate protruding material at the joints, and also to keep the opening permanently sealed and watertight, no matter how much the adjoining concrete slabs contract and expand.

Progress

For every linear foot of 25-foot pavement on the runway, 1.62 cubic yards of concrete are required. With four pavers working, an average of 275 cubic yards of concrete was usually placed every hour. At times this output was increased to 300 yards per hour, and with five pavers the contractor expected to maintain production at 325 yards hourly. The maximum run with four pavers was 1,288 linear feet of 25-foot runway pavements, 21 inches thick, in 9

(*Concluded on next page*)

470 FOURTH AVENUE

New York 16, N.Y.

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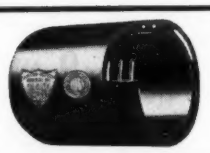

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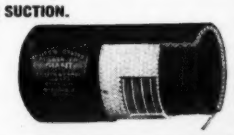

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C. & E. M. Photo
This Aeroil Heet-Master is one of the bituminous kettles used on the Patterson Field job for heating Careylastic rubberized-asphaltic joint filler.

hours. In the beginning of the project the contractor, W. L. Johnson Construction Co. of Columbus, Ohio, worked a single 10-hour shift, but later in the summer he worked two 8-hour shifts. The maximum production to date in a 16-hour day has been 3,108 linear feet of 21-inch pavement 25 feet wide.

With the single shift an average force of 300 was employed in the following classifications:

Grading	36
Drainage	36
Engineering—survey and stakeout	14
Batch plant	15
Fine-grade	13
Handling and setting dowel bars	15
Form setting	26
Loading and setting wire mesh	6
Unloading cement	8
Paving crew	40
Truck drivers	60
Pouring joints	5
Electrical installations	12
Supervisory personnel	14
Total	300

After lane 7 on the runway was paved from the center to the east end, the work continued down taxiway lane 4, which is the fourth of six lanes, counting from the north. At the midpoint of the taxiway a connection back to the runway was made by paving X-3, the third lane from the west on the connecting taxiway. Then paving at the runway was resumed on lane 6, working again from the center to the east end.

The entire eastern half of the project was completed first so as not to interfere with landings and take-offs on runway C at the west end of the big airport. When the closure at the end of runway A was completed, progress could be made at the west half of the VVHB runway and the taxiway.

New Additive for Concrete

An organic agent for addition to cement or mortar mixes is described in a bulletin made available by Hopper Products, Inc., 12 E. 41st St., New York 17, N. Y. This liquid agent, known as Portite, is said to produce a more easily workable concrete with less water, reduced shrinkage, and elimination of segregation and dusting. It is claimed that the addition of ¼ pint of Portite per bag of cement will reduce water requirements by as much as 35 per cent.

According to the manufacturer, Portite is non-contaminating, non-irritating, and non-toxic. Distribution formerly has been limited to a small eastern area, but it is now being extended to cover the entire country.

The bulletin tells of the advantages of Portite, gives directions on where and how to use it, and includes other relevant data. Several on-the-job photographs show projects on which it has been used successfully.

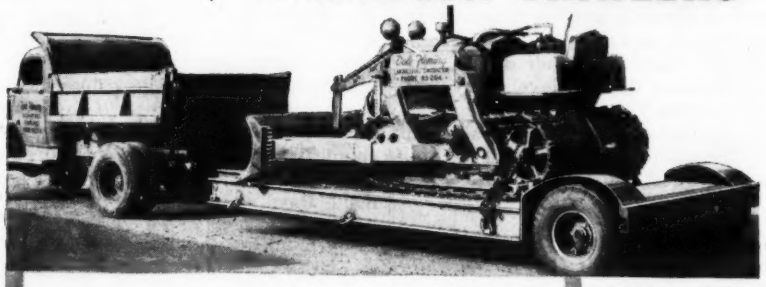
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 87.

A Lima Type 750 dragline loads clay and loam from a borrow area into a 13-yard bottom-dump Euclid on Bayou Bodcau Dam in Bossier Parish, La., about 25 miles northeast of Shreveport. This machine, owned by H. N. Rodgers & Sons Co., Memphis, Tenn., has a 50-foot boom and is powered by a Caterpillar D17000 diesel engine.

Your Dump Trucks do DOUBLE DUTY with

ROGERS "TAGALONG"

Frontloader TRAILERS



Now, you can haul light and medium shovels, cranes, bulldozers, etc., to and from the job with a Rogers Tagalong and your dumptruck will serve as the tractor.

With drawbar on ground, equipment is loaded and unloaded from trailer front. Dumptruck rear is backed over drawbar front. Cable and pulley action caused by elevation of dump body lifts drawbar and engages a towing tongue.

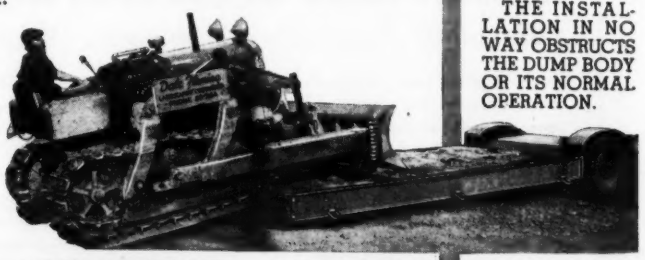
Safety coupling pin is inserted and dump body is lowered. Your Tagalong is now ready to roll.

AVAILABLE IN 10, 15 AND 20 TON CAPACITY SIZES

Towing tongue, cable and pulleys used to adapt dump truck constitute a negligible weight and do not in the least impair normal usefulness of the vehicle.

THE INSTALLATION IN NO WAY OBSTRUCTS THE DUMP BODY OR ITS NORMAL OPERATION.

PATENTS PENDING



Showing cable around sheave and dump body about to be raised to engage towing tongue.

Body elevated. Tightened cable has raised drawbar and engaged towing tongue. Safety coupling pin is inserted. Trailer is ready to roll when body is lowered.

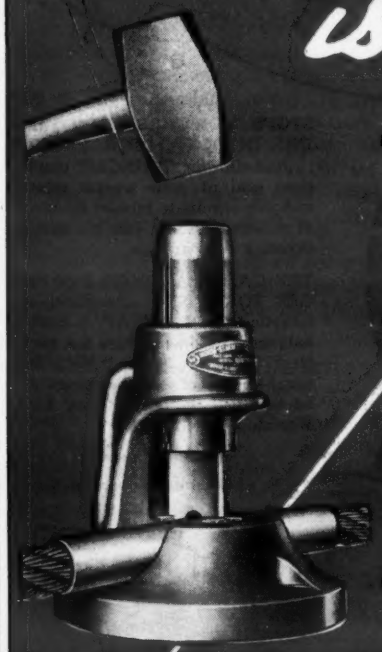
ROGERS BROS. CORP.

DESIGNERS and BUILDERS OF HEAVY DUTY TRAILERS SINCE 1915

EXPERIENCE builds 'em PERFORMANCE sells 'em

108 ORCHARD ST. ALBION, PENNA.

Cutting WIRE ROPE is easy



- **FAST** Specially designed cutting blade and dies combines fast cutting action of the hammer principle eliminates any special skill requirements.
- **CLEAN** Wire rope ends are cut smooth and clean for perfect threading or splicing.
- **SAFE** The enclosed cutting blade locked in the body of the cutter assures perfect safety.
- **PORTABLE** Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1 1/16 inch, 1 1/2 inch.

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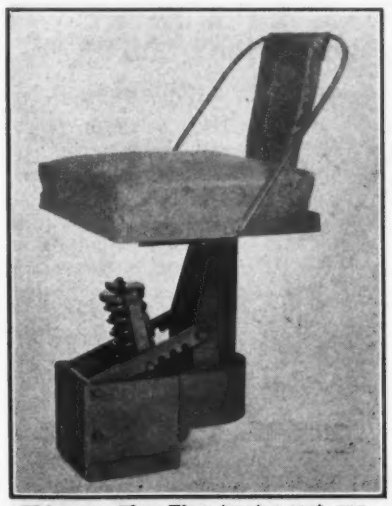
SEE YOUR DEALER OR WRITE DEPT. "B"

MORSE-STARRETT PRODUCTS COMPANY

1204 - 49th AVENUE, OAKLAND 1, CALIFORNIA



This new Flow-Ting tractor-seat support is designed to provide smoother riding, free from jars and jolts. A bucket-type seat or this upholstered model may be used with it.

Tractor-Seat Support

A new hydraulic-type tractor-seat support with a weight-adjusting feature has been developed by Knoedler Manufacturers, Dept. R-9A, Streator, Ill. Built in one model, it is said to be adjustable to fit all popular makes of tractors, and its seat bracket is designed to fit the standard bucket-type seat or an upholstered model.

The Flow-Ting seat support combines a hydraulic shock absorber built inside a soft coil spring, similar to automotive shock absorbers. The soft coil spring goes down easily with any impact, it is stated, and the shock absorber retards the return action of the spring.

One of the features of the seat support is a device providing four adjustments to suit operators' weights of from 75 to 275 pounds. Another design feature maintains the seat level regardless of the terrain.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 39.

Air Compressors Described

Publication of a leaflet which describes the new Air Chief line of industrial air compressors is announced by the Davey Compressor Co., Kent, Ohio. This bulletin, No. E-219, contains complete data and specifications for the Davey line.

It describes the departmental units of 60, 105, 160, 210, and 315-cfm capacities. It also tells about the bare compressors suitable for installation with customers' motors, or as replacement machines.

Advantages of the departmental or at-the-job compressor system are described in detail. Under this system, each department or gang has its own compressor operated in accordance with its individual requirements.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 83.

Air-Entraining Agent

An air-entraining agent in powder or liquid form is made by the A. C. Horn Co., Inc., 43-36 10th St., Long Island City, N. Y. According to the manufacturer, Ayr-Trap will keep the amount of air trapped in the concrete between the limits of 3 to 5 per cent.

Features attributed to this agent include: safety—it will not increase or decrease the amount of air to any extent should small deviations occur when adding it to the mixture; Ayr-Trap is relatively independent of the proportion of sand in the concrete, and the same amount is used per bag of cement in 4, 5, 6, or 7-bag mixes; it is relatively independent of the slump of the concrete and of the mixing time; it contains no accelerators or set correctives; it will not deteriorate or cake from standing.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 8.

Safety Face Shields

Plastic shields for protecting a worker's eyes and face are manufactured by the Firemen's Safti-Shield Co., Inc., P. O. Box 928, Asheville, N. C. Made of Plexiglass, they have frames of 61ST aluminum with a sponge-rubber headband lining. They are said to fit any size head without the need for mechanical adjustment. Their durable, rigid construction and light weight make them suitable for both light and heavy duty, it is stated.

Safti-Shields, on which a patent is pending, are made in thicknesses of .060, .080, and .125, and can be furnished with clear or green-tinted Plexiglass. A safety catch is provided to prevent the visor from hitting the face of the wearer.

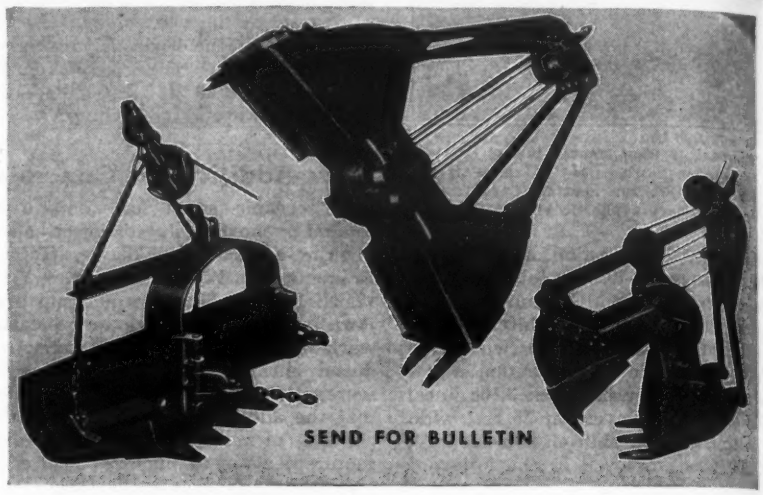
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 7.

Data on Diesel Engines

A folder describing a 190-hp diesel power unit has been prepared by the Waukesha Motor Co., Waukesha, Wis. This model, the 6-WAKDU, is rated at 190 hp at 1,300 rpm. The folder features a cutaway drawing which shows the important features of operation and construction of this Waukesha engine.

Folder No. 1418-A has a list of engine dimensions, a performance graph, and a description of standard equipment which is furnished with the Model 6-WAKDU.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 86.



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WELLMAN

Williams Type **BUCKETS**

Count on longer life and more efficient service..due to Wellman original **welded rolled steel construction.** You get the maximum digging power, and exceptional strength—without excessive weight! Specify Wellman, and you'll specify the best bucket for your purpose.

THE WELLMAN ENGINEERING COMPANY

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BITUMINOUS DISTRIBUTORS

Controlled Application Eliminates Waste

The large pump capacity and efficient control of Kinney Distributors insure fast application: compressed air, automatically admitted as spray bar is closed, cleans bar thoroughly. One simple, three-way valve controls the entire operation of the Kinney Distributor, from circulating or loading, to spraying. Exact register of application strips, without wasteful overlap, is easy with large handwheel control. The Kinney jacketed Rotating Plunger Pump is famous for speed and accuracy... it permits high road speeds and applies bitumen in exact quantity specified. Whatever grade of bitumen you use on road work — tar, asphalt, road oil, cutback or emulsions — Kinney Distributors will handle it accurately, fast, and economically.

Write for Bulletin.

KINNEY MANUFACTURING CO.

3531 WASHINGTON ST., BOSTON 30, MASS.

New York • Chicago • Philadelphia • Los Angeles • San Francisco

We also manufacture Vacuum Pumps, Liquid Pumps and Clutches

RAINCAP

STOPS MOISTURE FROM FALLING INTO TRACTOR EXHAUST . . Just slip the "RAINCAP" over the open end of your tractor exhaust, and you eliminate forever the danger of moisture falling into the exhaust, injuring your tractor.

THE CAP THAT DOES NOT FORGET TO CLOSE . . Completely automatic—the "RAINCAP" is counterbalanced to open when the tractor starts and close when it stops. Rust proof—made of cast aluminum—can be installed in two minutes. F.O.B. Waterloo, Iowa.

Immediate delivery

Liberal dealer discount

No.	O.D. Exhaust	Price
1	2⅛"	$1.90
2	2⅜"	1.90
3	2¾"	1.90
5	1⅞"	1.90
55	2"	1.90
6	1½"	1.90
66	1⅜"	1.90
7	2½"	1.90
8	3"	2.50
9	3⅛"	2.50
10	3¼"	2.50
11	3½"	2.75
12	4"	3.00

Write Dept. C-1

WATERLOO FOUNDRY CO., WATERLOO, IOWA

The Ware front-end loader is made for mounting on an Oliver Model 70 industrial tractor. The unit is hydraulically controlled, has a 10-cubic-foot bucket, and will load up to 8½ feet.

New Front-End Loader

A front-end loader for mounting on an Oliver Model No. 70 industrial tractor is made by the Ware Machine Works, Ware, Mass. Known as the Ware loader, this hydraulically controlled unit has a 10-cubic-foot bucket. It is designed for handling gravel, coal, loam, snow, or any loose material. It will load up to 8½ feet and can be dumped at any height, says the company. Lifting capacity is 2,000 pounds.

Overall length of the unit is 186 inches; overall width, 62 inches; and overall height, with the bucket lowered, is 63 inches. Weight of the loader unit is 1,340 pounds. The bucket will drop 5 inches below ground level. Special tooth buckets, snow buckets, and a snow-plow attachment are available to increase the versatility of the unit.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 28.

Utility Air Drill

A new model of Jackhamer is now offered by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. This air-operated drill has been designed and built for general utility and maintenance work. The manufacturer says it is fast, powerful, easy to handle, has strong rotation, hole blowing, and uses standard Jackbits.

A built-in oil reservoir in the handle is said to supply ample lubrication. Throttled control is employed to permit the selection of the right kind of blow for any type of work or tool. The J-10 can be used with drills, chisels, gouges, moil points, etc. With the use of adapters, star drills can be employed to drill holes of 1⅛ inches and under. If the rotation pawls are removed or round-shanked tools are used, the drill can be used as a light paving breaker, or for chiseling and channeling. Its total weight is 14 pounds. It is 17⅛ inches long.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 100.

Roebling Names Christie

The appointment of H. S. Christie as Manager of the Atlanta, Ga., branch office has been announced by John A. Roebling's Sons Co., Trenton, N. J. Mr. Christie replaces C. G. Mullings, who recently retired after 45 years with the company.

New Rotary Scrapers

Rotary wheeled scrapers with either hydraulic or manual controls are made by the Atlas Scraper & Engineering Co., Inc., 6203 Maywood Ave., Bell, Calif. Either style can be furnished with rubber or steel wheels, located inside or outside the bowl frame. They are designed for use with any make of tractor.

The Atlas scraper is made in models with capacities ranging from 30 to 100 cubic feet. All operations are controlled by two levers moved by ropes leading to the tractor seat. The front lever controls the digging position and the rear lever trips the bowl for rotation. The bowl can be set to dig, scrape, or rotate.

The hydraulically controlled Roto Carry scrapers have the same basic design as the Model C and F scrapers. Hydraulic control is provided by a double-acting cylinder attached to the scraper frame and to the center control bar. Rated capacities vary from 37 to 56 cubic feet; bowl widths from 5 to 7 feet.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 6.

NOW Rolled from Alloy or Mild Steel

Caine CORR-PLATE Steel Piling

Rolled from a new steel alloy, Caine Corr-Plate is now 25% stronger and has nearly 100% greater corrosion resistance. This alloy makes available equal strength and nearly double the life in a 25% lighter piling. Approved by Highway Departments and U. S. Engineers.

Caine Corr-Plate Steel Piling has been used the world over for Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, Sewers, Disposal Plants and hundreds of other jobs—it's stronger, lighter, nestable, easy to drive and water tight; can be re-used again and again.
Doubled life and 25% greater strength make Caine Corr-Plate Steel Piling the bargain buy in piling!

NOW, MORE THAN EVER BEFORE . . .
STRONGEST PER POUND WEIGHT
CAINE STEEL COMPANY
STEEL PILING DIVISION, 1820 N. Central Avenue, Chicago 39, Ill.

"U.S." BUILDS THE RIGHT ELECTRIC PLANT FOR YOUR NEEDS!

1500 WATT PORTABLE

• For Operating Power Tools • Floodlights • Field Repair Shops • On Service Trucks • Paving Machines • Power Shovels • Earth Moving Equipment, etc.

"U.S." BUILDS A COMPLETE LINE of Gasoline and Diesel Electric Plants up to 140 KW—for stand-by, continuous duty, battery-charging, and portable uses. Skids, rings, porter bars, and trailer mountings available. Write for literature, stating type of unit and capacity required.

UNITED STATES MOTORS CORP.
554 Nebraska Street Oshkosh, Wisconsin
Factory representatives strategically located throughout U.S.A. and Canada.

Heavy-duty trailers from 5 to 100 tons

***SAFE* FOR THE BIGGEST LOADS**

HAULING CONTRACTORS everywhere depend on Jahn Heavy-Duty Trailers for safe, fast and economical moving of their heaviest loads like this 110,000-lb. transformer. Deep, wide flange main beams run the full length of the trailer. Cross-members and outriggers are I-Beam sections. Improved, fabricated gooseneck adds greater built-in strength. Positive, self-equalized braking at each wheel regardless of position of axle assures maximum safety. See your nearest Jahn dealer for details.

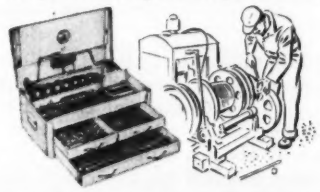
JAHN TRAILERS ALL OVER WORLD

Reg. Trade-Mark

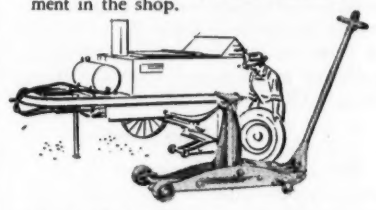
C. R. JAHN COMPANY
DEPT. 1347 - 1106 W. 35th St., CHICAGO 9, ILL.

BLACKHAWK PRODUCTS are Basic in CONSTRUCTION and MAINTENANCE

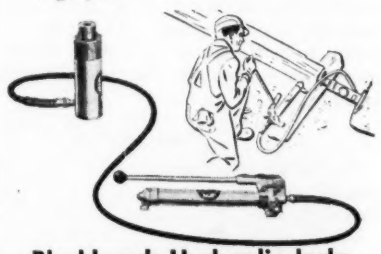
Blackhawk Socket Wrenches — in a complete range — give you exclusive combinations of handles, sockets and attachments that speed work —Blackhawk Wrenches with patented thumb release "Lock-on" create *extra* safety and more dependable performance.



Blackhawk Hydraulic Service Jacks — are indispensable in the shop or on the job. Sure, fast, 24" lift of the Blackhawk S4, with EXCLUSIVE features, makes it ideal for high axled machinery — and for jockeying equipment in the shop.



Porto-Power — EXCLUSIVE — is literally an all-purpose tool. It pushes, pulls, bends, clamps, presses and straightens—with tons of power. This safe, easily transported, remotely controlled hydraulic jack provides on-the-spot hydraulic power to lick 1001 tough jobs.



Blackhawk Hydraulic Jacks — meet the demands of construction work with an unequalled "service proved" record of dependability, performance and freedom from maintenance. Powerful, fast acting, Blackhawk Jacks are real time savers on the job.

One-Man Operated
Even the 50-ton Blackhawk jack can be carried and operated by ONE MAN.

THE blistering pace of construction will require the best in fast working, modern tools. Unmatched versatility, speed and dependability of Blackhawk Products make them key tools for you. This multi-purpose equipment serves in every phase of construction and maintenance work. These modern, quality Blackhawk tools are built tough and rugged to stand the gaff. They're basic design is different, making them tops for speed and utility. For complete information on Blackhawk Products write us or see your Blackhawk Equipment Distributor. BLACKHAWK MFG. COMPANY, Dept. P-18117, Milwaukee 1, Wisconsin.

BLACKHAWK

Underwater Digging

Trench Excavation

Pipe Line Laid Under Water

By RALPH Z. KIRKPATRICK

✦ SOME time this autumn, the second of two subaqueous pipe lines will be completed on the shore of Lake Ontario at Charlotte, the port of Rochester, N. Y. Both jobs were consecutive, were only about a mile apart on the same beach, and were handled by Merritt, Chapman & Scott Co. of New York City, with the same personnel, yard layout, and equipment. But they were for two different companies.

The one pictured, a $600,000 contract begun last spring, was for the Rochester Gas & Electric Corp. It is part of a proposed $52,000,000 5-year enlargement-improvement program. It meant laying an 84-inch pipe line for 5,100 feet—4,000 of them under water, the rest on land. It also included grading and leveling for a new steam-driven 160,000-kw lake-side power plant.

Pipe Casting

The Lock Joint Pipe Co. of New Jersey made the concrete pipe for both jobs. It was able to secure the space for a crane-equipped yard at Charlotte's municipal docks. There it cast the Gas & Electric Corp.'s pipe in 12-foot sections.

In the fabrication yard, reinforcing steel was mechanically wound around a mandrel and supporting strips spot-welded on. Then locomotive cranes placed the finished forms around the steel, and the casings were filled with concrete from a near-by mixing plant. The pipes were cured under a gentle spray of water. They were tow-barged or were taken by trailer to the sites for laying.

Pipe Laying

For underwater digging, the contractor used the following equipment: a drill barge fitted with three 6-inch steam-driven Sullivan drills; a heavy derrick barge called The Amazon (both these barges were equipped with winches and donkey engines); a workboat or two; the tug Aubrey; and several locomotive cranes. For the most part, the non-engined boats shifted position by themselves, by winching on a quartering system of cables to 17-ton concrete anchors placed by tug.

Hardpan strata made excavation difficult. The drill barge prepared holes about 28 feet deep for blasting, since navigation rules require a minimum top-of-pipe clearance of 21 feet. The holes were shot, and shattered material was cast to one side.

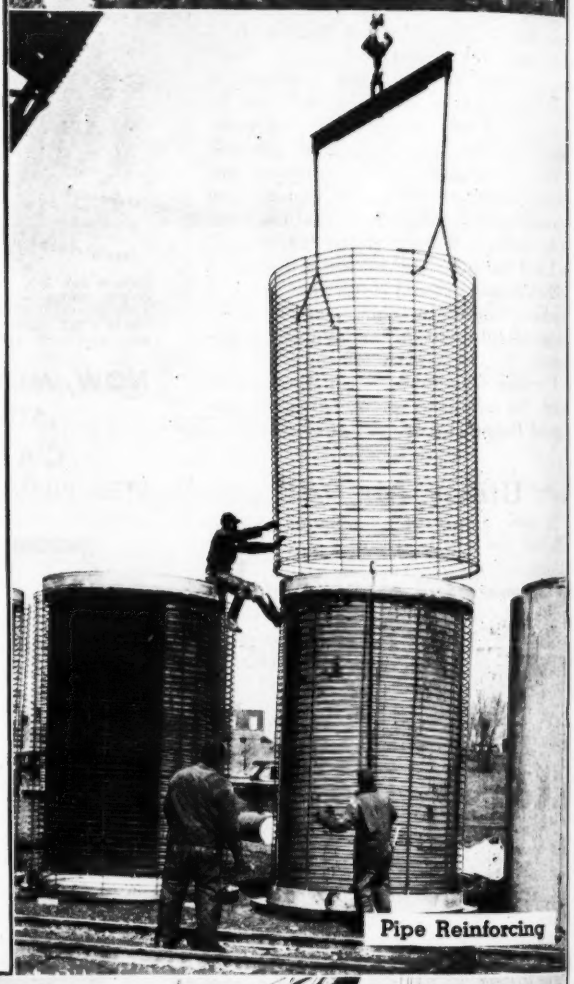
The derrick barge lowered pipe sections into place as they were barged to the site. Divers working on each side fitted the joints together, using heavy hammers and their sense of touch to drive wedges and supports into place, then measure and adjust the distances between the pipe joints.

Finally, the finished trench was backfilled and leveled off by the bucket and dragline scoop on the derrick barge. And a specially designed crib intake was placed, well below navigational interference, at the end of the pipe line to screen it against debris.

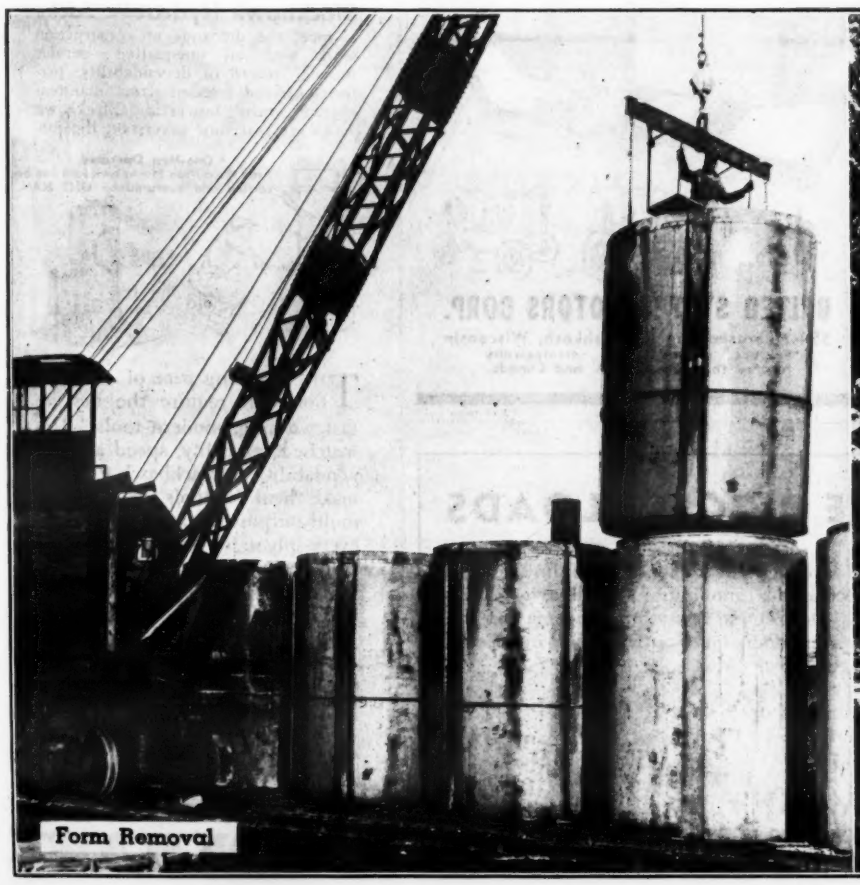
The 1,100-foot land section of line was subcontracted by A. Friederich & Son of Rochester, N. Y.

Personnel

For Merritt, Chapman & Scott, Eric C. Wikstrom was Superintendent until his death on August 15 of this year. Alfred Siskind, who was Field Engineer on both jobs, was appointed to carry on in his stead. Paul B. Rombaut was Field Engineer for the Rochester Gas & Electric Corp.



Pipe Reinforcing



Form Removal

Pipe Laying

R. G. Zellers Photo
This high-speed haul road, serviced by a Caterpillar No. 12 motor grader, accommodates Euclids hauling borrow-pit material to the screening plant at Granby Dam site.

Granby Constructors Photo
During operations at Granby Dam in Colorado, a Bucyrus-Erie 54-B shovel loads a 13-yard end-dump Euclid with cofferdam material.

Processing Material For Granby Dam Job

(*Continued from page 2*)

trouble still persisted, and arrangements are now under way to make further changes in the plant before full-scale earth-fill operations begin above the cut-off walls.

While arrangements are not final, it appears that the feeder arrangement may be replaced by two Link-Belt reciprocating feeders, of heavy-duty capacity. The screens have already been replaced by 5 x 12-foot Simplicity single-deck vibratory classifiers. A water jet has been installed to permit moisture to be added to the material if necessary. Compressed-air jets prevent the impervious material from sticking in the lower bin.

The plant has been turning out 3,000 cubic yards of impervious material and perhaps 600 cubic yards of oversize each 8-hour shift. When the contemplated changes are made in this set-up, material will be routed as follows:

Five end-dump Euclids will haul pit-run material from a Model 1201 Lima shovel with a 3½-yard dipper in the pit, and dump it on the scalper grizzly. Reciprocating feeders will move the heavy stuff along to the vibrating screen, where the fines will drop through to the impervious bin, the plus-3-inch cobbles to the rock bin, and of course the oversize plus-6-inch rock to the same hopper.

Five bottom-dump Euclids will take the fine material from the temporary storage bin out to the dam. The oversize rock, which can be worked in with blasted stone for riprap, is being hauled to Dike No. 3 and stockpiled for later use.

When the change is made in the plant, it is expected that the large, heavy loads will be carried onto the screens with no delay. This will speed up the classifying plant to the point where possibly more than the one Lima shovel can be put in the borrow pit.

Processing of Earth Fill

Methods of earth-fill processing now in use are designed to meet fully the specifications and standards set up by the Bureau of Reclamation, and are not likely to change. The bottom-dump Euclids come down a haul-road ramp to the fill and dump their loads to make lifts not more than 6 inches thick, uncompacted.

A Caterpillar D8 tractor with a Caterpillar bulldozer blade and a cable-controlled scarifier in the rear then levels off the dumped material and scarifies it if necessary. When a lift of earth has been dumped full length of the plug now being placed, a sheepsfoot roller built to Bureau specifications by the F. W. McCoy Co. makes twelve complete passes. Weighing 15 tons, this big roller has to be drawn by a D8 Caterpillar tractor.

The twelve passes compact the material to at least 98 per cent of laboratory test densities. Because the material has a great deal of clay present, it takes up to 14 per cent of moisture and compacts readily to make a tight hard fill.

Rain and snow in the spring combined to slow the placing of earth fill. But when rain starts to fall hard enough to interfere with the placing of dirt, the bulldozer smooths and slopes the surface to prevent the excess moisture from ruining more than just the top inch or two. All exposed lifts are thoroughly compacted, and then the area is back-bladed by the dozer.

The soil shows a tendency to dry out

(*Concluded on next page*)

20% to 30% more footage

AIR PLUS JAEGER COMPRESSOR with Jaeger Model 600

Compressor behind your wagon drills

600 cu. ft. of air per minute, delivered at standard engine speed, operates two big 4″ drills at top efficiency plus hand-held drill for secondary work.

Gives you the world's fastest drilling team on wheels, with a more portable compressor than your old 500 ft. machine.

Jaeger engineering, applied to biggest portable compressors, provides the 100 additional cubic feet of air you need to keep two wagon drills under full operating pressure and also handle secondary drilling, without wasteful engine speeds or a bigger, clumsier machine. The Model 600 "AIR PLUS" is powered with Murphy ME-66 Diesel, operating at 1225 r.p.m., and ruggedly but compactly designed to trail wherever big material trucks can travel. Built to micro-precision standards with giant "ultra lapped" valves, 100% efficient air intercooling and automatic drainage, it delivers this air at 100 lbs. pressure within 100° of ambient temperature and with a minimum of moisture. Full force feed lubrication, oversize air receiver and tool boxes, electric starter, sectional radiator and intercooler, etc. are standard.

Other Jaeger "AIR PLUS" Compressors with these same features are available in 60 to 500 ft. sizes — gasoline, diesel or electric powered. See your Jaeger distributor.

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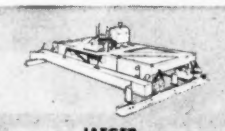

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"SPEEDLINE" Concrete Mixers

"SURE PRIME" Contractors Pumps

JAEGER Engineered EQUIPMENT

"DUAL-MIX" TRUCK MIXERS, AGITATORS — HOISTING ENGINES, SELF-RAISING TOWERS — CONCRETE AND BITUMINOUS PAVING EQUIPMENT

Processing Material For Granby Dam Job

(*Continued from preceding page*)

readily enough when the rain stops, and operations can often be resumed in a few hours or less. Before placing additional lifts on sealed material, the surface is lightly scarified to make a perfect bond.

As the earth fill rises, a certain amount of hand work is of course necessary around the rock abutments. Occasional loads of dirt are dumped as near as possible, shoveled in close in 2-inch layers, and carefully tamped by pneumatic Gardner-Denver pavement breakers with special tamping heads built by the McCoy Co.

Densities on the materials placed in this manner are also well up towards the top of the optimum-density curve.

Not until the cut-off walls are built and covered with earth will the fill area really be big enough to operate at a high rate of production. According to present indications, the first material next to the cut-off wall may have to be clammed in and tamped slowly. A sheepsfoot roller will start to work as soon as possible, and the hauling units will carry the dirt down in the hole as soon as a road is possible.

The slope lines for the division of zones have been already painted on the rocky abutments to make things easier as the fill rises. With the big barrier 1,400 feet wide at its base, it will take months to make any appreciable showing.

Earth-fill operations are being administered under the direction of Ed Honnen, Project Manager for Granby Dam.

Electric Generators

A new generator for use in engine-generator sets has been announced by the Electric Machinery Mfg. Co., 821 Second Ave., Minneapolis 13, Minn. It is described as a factory-assembled packaged unit containing a revolving-field generator, direct-connected exciter, automatic voltage regulator, meters, and a selector switch for pre-setting voltage. The only external connections needed are leads to a generator switch.

The built-in automatic voltage regulator has no moving parts. According to specifications released by the manufacturer, it is permanently connected and factory-adjusted to hold terminal voltage within 2 per cent of the voltage selected at any load or power factor within the generator rating. The principle of electrical resonance, used for tuning of radios, is used to hold constant voltage.

Popular 60-cycle ratings at standard voltages and 0.8 power factor include: at 1,200 rpm, 18.7, 25.0, and 31.3 kva; and at 1,800 rpm, 25.0, 31.3, and 37.5 kva.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 17.

Paint Protects Wood

A wood-preservative paint to prevent rot and decay is announced by Speco, Inc., 3142 Superior Ave., Cleveland, Ohio. Known as Woodtrem, it is said to penetrate deeply into the pores of wood surfaces and to seal out moisture effectively. Its creosote content, says the manufacturer, is poisonous to bacteria.

Woodtrem is especially recommended by Speco for wood that is to be buried in the ground or laid on an earth surface, such as piers, posts, railroad ties, foundation timbers, etc. It is available in either black or aluminum. The company suggests the aluminum for applications where it is desirable to paint over Woodtrem with another type of paint.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 92.

Line-Measuring Instrument

A leaflet showing the new Minerva Curvimeter has just been issued by the Herman H. Sticht Co., Inc., 27 Park Place, New York, N. Y. Imported from Switzerland, this Curvimeter can be used for measuring line lengths up to 1,200 feet.

Bulletin No. 600 describes the features of this device, shows how it is to be used, and lists the scales on the dial.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 97.

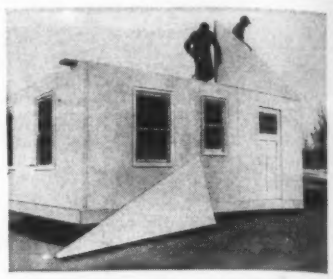
New Plant for Eutectic

The opening of a new plant at 110 Duane St. in downtown New York City has been announced by the Eutectic Welding Alloys Corp. The plant, covering approximately 37,000 square feet, is equipped with air-conditioning and dehumidification chambers for rod flux-coating processes.

Pre-Built Buildings Serve as Field Shop

Deliveries on a new pre-assembled building for use as field office, field shop, or similar purposes are now being made by Harnischfeger Corp., P&H Houses Division, Port Washington, Wis. The building provides an inside space 20 x 20 feet, and the company says that it can be completely assembled in one day by two or three men.

Walls, floor, and ceiling are insulated with Balsam-Wool to equip the buildings for year-round use. Finished double-walled sections interlock with each other. Window panels have glazed sash and weatherstripping already installed. Door sections are shipped out with the doors already hung. Specially designed P&H wall and door partitions are made so that the interior can be divided as the user wishes.

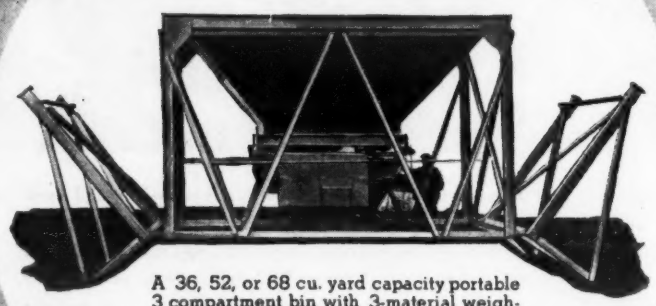


This pre-assembled P&H building, suitable for a field shop or office, can be erected in one day by two or three men, according to the maker.

Each P&H house is supplied structurally complete with standard doors, sash, hardware trim, shutters, roofing liner, and heavy asphalt strip shingles. Inside surfaces are treated with a clear, penetrating base coat, and all exterior surfaces are primed white.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 34.

ERIE TYPE "G A" PORTABLE AGGREMETER PLANTS



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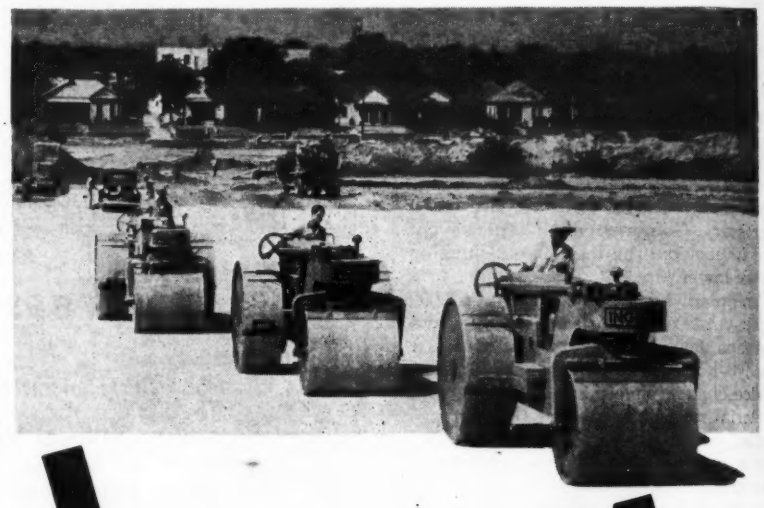

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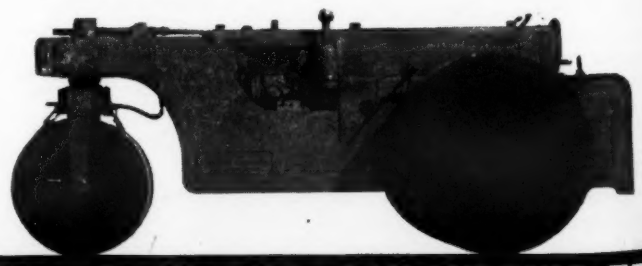

ACME IRON WORKS • SAN ANTONIO, TEX.

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Rights of Buyer When Sand Delivery Delayed

THE PROBLEM: *(1) A seller did not deliver sand within the agreed time. Did the buyer, a highway contractor, waive his right to claim damages for nondelivery by accepting belated delivery of part of the material? (2) How can we measure damages for breach of a contract to deliver material, where there is no market price for that material at the agreed place for delivery? (3) When is the seller liable for interest on the buyer's damages from the date of breach of the contract, as distinguished from the date when the damage award is made?*

THE ANSWER: The New Mexico Supreme Court decided as follows (Sundt v. Tobin Quarries, 175 Pac. 2d, 684)—(1) No. One aggrieved by breach of a contract does not waive a right to resulting damages by accepting insufficient performance, whether the contract be for a sale of goods or some other kind. He does waive the right, however, if he accepts the insufficient performance, agreeing to treat it as full performance of the contract, or if "the seller's default is caused by excusable impossibility". The court found that the contractor had impliedly extended the time for delivery after default, but that there was no intention to waive a damage claim.

(2) Defendant seller agreed to deliver the sand f.o.b. Logan, N. Mex. So damages recoverable by the plaintiff contractor, as to sand not delivered, must be measured by how much the market value of sand at Logan exceeded the agreed price on the date of the seller's breach. Since there was no market for sand of the contract kind in New Mexico, its value at Logan was properly computed on two bases: its market value at Amarillo, Texas, the nearest and best market, and freight charges for transportation to Logan.

(3) The damages thus computable, interest was allowed from the date of damage, rather than from the date of judgement assessing damages. However, the court guardedly intimated that when computation of damages for breach of a contract is a difficult matter, interest should run from the date of judgement.

Soil-Conservation Worker Not Deemed "Farm Laborer"

THE PROBLEM: *A clause of the Workmen's Compensation Act exempts from operation of the act employers of "farm laborers". Was the operator of a contractor's bulldozer a "farm laborer" while he was engaged in moving dirt on a farm during a soil-conservation project?*

THE ANSWER: No, said the Nebraska Supreme Court. (Oliver v. Ernst, 27 N. W. 2d, 622.)

The court followed reasoning of the Minnesota Supreme Court, to this effect: merely because construction work may be such as a regularly employed farm hand might do, thereby exempting the farmer-employer from liability for an injury under the Workmen's Compensation Act, does not argue that a worker engaged by an independent contractor in performing like work is classifiable in the same category for purposes of compensation liability.

Rock Is Overestimated In Invitation for Bids

THE PROBLEM: *An invitation for lump-sum bids on a Federal construction job estimated the yardage of rock to be excavated at 1,200. The contract provided for adding or deducting from the contract price $7 per yard for actual excavation more or less than 1,200 yards. The quantity actually excavated was only 42½ yards. Was the contractor entitled to an equitable adjustment of the deduction to be allowed the Government?*

THE ANSWER: The United States Court of Claims said no, because he did not prove what would be an equitable adjustment. (Hedin v. United States, 69 Fed. Supp. 113.) But the court recognized that, on proper proof, the deduction to be allowed the Government should have been pared down. It said in part:

"This [the 1,200-yard estimate] was, it seems to us, a representation that this estimate was reasonably accurate, and was based upon some investigation and knowledge which would make it so. . . . A bidder might discover that this $7 price [for excess or deficient rock] was wrong. If it was, and if he made a close bid based upon a materially smaller unit figure which the excavation would actually cost him, then if the yardage turned out to be much less than the estimated amount, he would be badly hurt by the deduction at the $7 rate which would be in excess of the figure he actually used in computing his bid. Hence we are inclined to think that a bidder who, in those circumstances, received the contract, would not be bound to permit a deduction to be made at the arbitrary figure for such an extraordinary deficiency of yardage. The plaintiff has not, however, shown that his situation is like the one described above."

The rock excavation was sublet by plaintiff at $3 per yard, but that did not enter into computation of plaintiff's bid. Plaintiff had signed his contract before he communicated with the subcontractor. It did not appear that plaintiff, who was a nonresident, knew the local rate for rock excavation; so it was unlikely, the court said, that "he would have estimated rock excavation . . . at an amount materially less than the figure stated in the invitation for bids to be the price for excavating rock. . . . It would not have been equitable to make the deduction at the $3 rate and leave the plaintiff with an unearned profit of $4 per cubic yard for a large quantity of rock which he did not excavate, but which he estimated in his bid at the $7 rate."

Engineer's Certificate Is Vital to Delay Claim

THE PROBLEM: *Was a subway contractor entitled to additional pay for a delay caused by the engineer's change in construction procedure? These were the circumstances:*

The contractor did not apply to the engineer, as provided by the contract, for a certificate as to the duration of the delay and the amount to be allowed. The contract required that controversies of engineering character be submitted to the engineer for decision. Admittedly, the engineer acted in good faith when he ordered a change in construction procedure, "to insure greater . . . safety for property and persons involved in the construction, and to prevent change of the movement of the earth, which occurred

(Concluded on next page)

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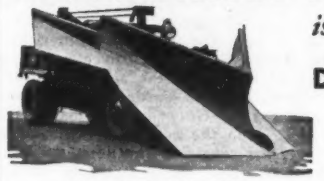

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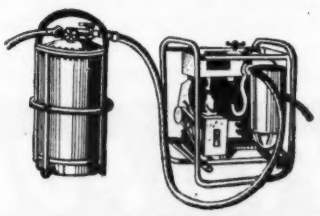
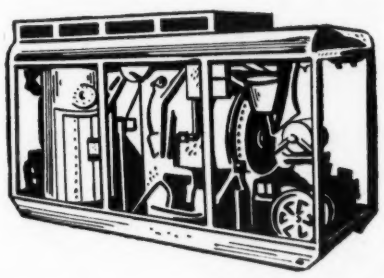
If you have not yet received your copy of the booklet pictured above, send for it today; it contains illustrations and descriptions of many available units other than those shown on this page, and tells where this equipment is located.



PORTABLE WATER PURIFICATION UNIT (MOBILE)—Consists mainly of a pumping unit and a filter unit. The water is cleaned by harmless chemicals. Forcing water reversely through the filter washes the unit thoroughly.



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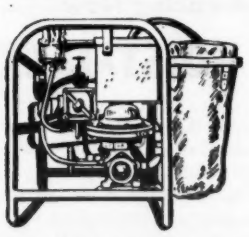

HYPO-CHLORINATION UNIT (AUTOMATIC) — Chlorinates from 2 to 100 gallons of water per minute. Unit consists of hydraulic operated hypochlorinator, water meter, pressure regulating valve and manual range adjusting valve.

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Avoid Legal Pitfalls

(Continued from preceding page)

when the construction progressed".

THE ANSWER: No, decided the Illinois Appellate Court, First District (72 N. E. 2d, 739). The court distinguished a case decided by the Illinois Supreme Court, where extra compensation was allowed without certificates which representatives of a sanitary district had arbitrarily and unjustifiably refused to issue. (Herlithy Mid-Continent Co. v. Sanitary District, 390 Ill. 160, 60 N. E. 2d, 882.)

Interest Is Recovered On Unliquidated Claim

THE PROBLEM: *Subcontractors sued for additional compensation and recovered part of what they demanded. The contractor unsuccessfully counterclaimed for damages for delayed performance. Were the subcontractors entitled to interest on the amount that they were awarded?*

THE ANSWER: Yes, said the United States Circuit Court of Appeals, Eighth Circuit, under the laws of Missouri where the contract was performed, regardless of the law of Illinois where the contract was *made.* (United States v. Henke Construction Co., 157 Fed. 2d 13.) Interest was collectible at 6 per cent from the date of demand.

The court cited decisions of the appellate courts of Missouri to the effect that interest is recoverable on an unliquidated claim and despite failure to collect the full amount sued for. In many states interest would not be recoverable under such circumstances.

Work Delay Is Excused When Contractor Dies

THE PROBLEM: *A construction contract provided for an extension of time for performance if the "work should be delayed on account of unforeseen causes beyond the control, and not due to any fault or negligence, of the contractor". Was his surety therefore entitled to an extension of time when the contractor was killed in an airplane accident?*

THE ANSWER: Yes, said the United States Court of Claims. (United States Casualty Co. v. United States, 67 Fed. Supp. 950.) The court said: "The death of the contractor, in view of all the circumstances of this case and the wording of the contract, should be construed as an unforeseen cause, and thus directly caused a delay of at least 40 days in the completion of the contract." Accordingly, the court decided that the Government was not entitled to an allowance against the surety of liquidated damages at $200 a day, provided for by the contract, so far as 40 days' delay was concerned.

The court added that even if the contract could not be so interpreted, the result would be the same. For when the contractor was killed, the Government permitted his administratrix to take the job over, without notifying the surety. In that view of the case, the Government must be deemed to have waived its right to liquidated damages for such delay as was entailed until the surety was finally notified to take over.

Contract Clause Applied Governing Pay for Extras

THE PROBLEM: *A Federal construction contract contained this familiar clause: "Extras. Except as otherwise herein provided, no charge for any extra work or material will be allowed unless the same has been ordered in writing by the Contracting Officer and the price stated in such order."*

The work was damaged by a hurricane, and the Federal regional director orally agreed that the contractor should proceed without prejudice to later determination whether it was the Government's loss or the contractor's. Was the contractor entitled to recover pay for repairing the damage?

THE ANSWER: No. (Blair v. United States, 66 Fed. Supp. 405, decided by the United States District Court, Alabama.) The court cited decisions of the United States Supreme Court to support a statement that the "law is clear that in contracts of this character defendant is not liable either on quantum meruit—that is, for the reasonable value of work done as distinguished from a contract price—or upon the contract unless the changes or extras were authorized by the proper officials of defendant and were approved as provided by the contract."

The court declared that the contractor's "remedy, if any, is to apply to Congress for relief. It is not for the courts to revise the written contract of the parties". It also pointed out that the contractor had neglected a remedy given under the terms of the contract: to have secured a ruling by the Contracting Officer as to his right to extra pay and to have appealed to higher authorities from an adverse ruling.

Dredge Workers' Status Under Federal Labor Law

THE PROBLEM: *Does the clause of the Federal Fair Labor Standards Act, exempting "seamen" from the provisions of the Act, exempt dredge workers engaged in reconstructing levees, improving navigable interstate waterways, and kindred work?*

THE ANSWER: No, said the United States Circuit Court of Appeals, Eighth Circuit. Such workers are not "seamen". Therefore their employers are not exempt from provisions of the Act concerning overtime payment and the keeping of records, etc. (Sternberg Dredging Co. v. Walling, 158 Fed. 2d 678.)

One of the company's seven dredges was self-propelled, and the others were towed by tugboats. They were mainly used in removing deposits of mud, etc., from navigable channels.

After noting the character of vessels, etc., used by the company, the uses to which they were put, the functions of employees, and the purposes of the Act, the court concluded: "Appellant's dredge employees are engaged primarily in, and . . . devote substantially all of their time to industrial as distinguished from maritime work. They are not employed in water transportation or in the navigation of vessels engaged in water transportation, except occasionally as an incident to their employment in dredging waterways. The mere fact that of necessity the work they do is performed upon navigable waters is alone not sufficient to remove them from the coverage of the Act. . . . It may well be . . . that in a given work week some of appellant's dredge employees, as for example those on the self-propelled dredge, may be employed as seamen when the dredge is moving from the scene of one dredging operation to another. But there is nothing . . . to indicate that any of the dredge employees have been in fact so employed for a substantial part of any work week in the past."

The court refers to similar decisions rendered by other Circuit Courts of Appeals.

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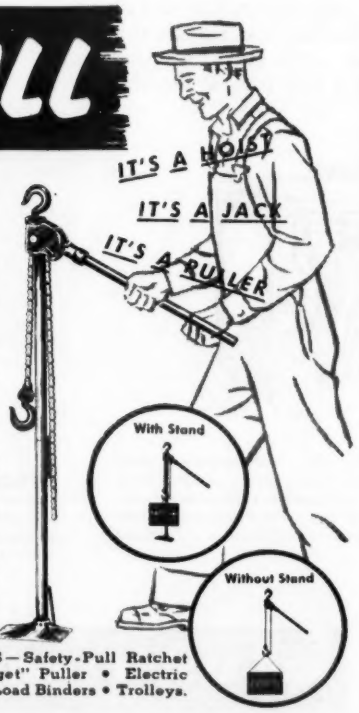

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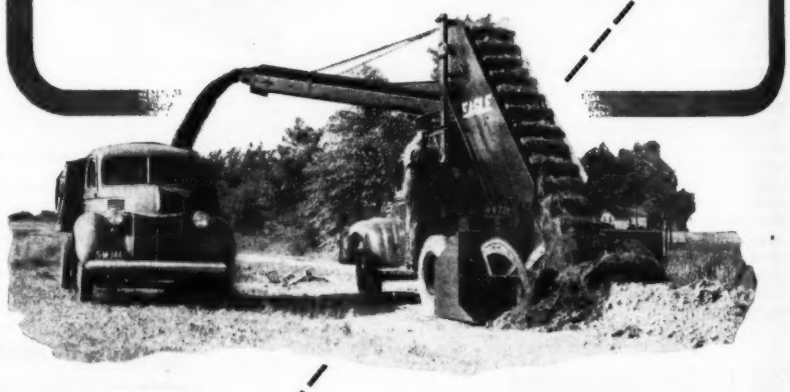

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Sheet Piling Is Driven To Protect Bayou Road From Wave Wash; to Be Paved With Concrete

• ON the map, State Route 620 in southern Louisiana is like a long curved finger reaching down to Grand Isle on the Gulf of Mexico. Most of the way it runs along Bayou Lafourche, a waterway of paramount commercial interest to the shrimp luggers and fishing boats that bring their catches up the bayou to the canning factories along its banks.

A 9-mile section of this road between Golden Meadow and Leeville is being reconstructed with a clamshell base course, 10 inches thick, to be topped later with a concrete pavement 20 feet wide and uniformly 7 inches deep. In several places where wave wash from the boats in the bayou had caved in the banks at the edge of the highway, sheet piling was driven to hold the new roadbed in place.

The Louisiana Department of Highways awarded a contract for the base-course and piling part of this job in Lafourche Parish to T. L. James & Co., Inc., of Ruston, La. It got under way in October, 1946, and was completed last spring. When paved, the highway will provide a paved surface along the bayou from Raceland on U. S. 90 to Leeville, 45 miles to the south. The remaining 21 miles to Grand Isle is still a gravel and clamshell roadway.

So also was the Golden Meadow-Leeville section a part gravel and part clamshell base, a few inches thick, when it was laid back in 1931 along the west bank of Bayou Lafourche. Prior to that time the road was a narrow single lane with occasional turnouts, yet sufficient for the transportation needs of the Cajuns with their horse-and-buggy mode of conveyance.

In the early 30's, however, oil was discovered in these Louisiana flatlands, and a new note was injected into the simple harmony of the fishing-agricultural economy of the bayou dwellers. The oil wells demanded better roads for the tank trucks and machine-laden transport trailers. Golden Meadow became an oil-boom town and the Lafourchais took to driving automobiles.

Hence the old dirt lane became a road, 20 to 30 feet wide; it was built by spreading gravel and clamshells 4 to 6 inches thick, and letting traffic compact the material into a fairly serviceable base. The need for a more permanent and durable highway in this populated community has brought about the recent 9 miles of reconstruction.

Clamshell Base Course

The old roadbed was first graded and shaped by two or three passes of a Caterpillar No. 11 motor grader in preparation for the new 10-inch clamshell base course which was spread over the existing surface. The clamshells were obtained from the A. J. Grubb Construction Co. of Gretna, La. That company dredged the entire amount, 49,565 cubic yards, from the bottom of Little Lake, an inlet of the Gulf lying 20 miles northeast of the project.

A 16-inch suction dredge pumped the shells into a fleet of 15 to 18 barges. These were towed, three at a time, to an unloading site on the bank of Bayou Lafourche about midway between Golden Meadow and Leeville. The passage from Little Lake to Bayou Lafourche was made through connecting bayous. A dipper dredge with a clamshell bucket unloaded the material from the barges into a 60-yard storage bin with a hopper bottom. The bin was so erected on the bank that trucks could run under it, collect a load of clamshells, and go on through. The dipper dredge kept the hopper bin filled at all times when the trucks were being loaded. To supply material for the base course was the extent of the Grubb contract.

A fleet of six trucks, holding about 5 yards each, belonging to T. L. James & Co. dumped their loads of clamshells down the center of the road in a shallow windrow. This was then spread out to an average width of 33 feet. Only a 5-inch course, or half the total depth, was spread at first inasmuch as traffic had to be maintained on the road during the construction. This would have been impossible if there had been an attempt to lay the full 10 inches.

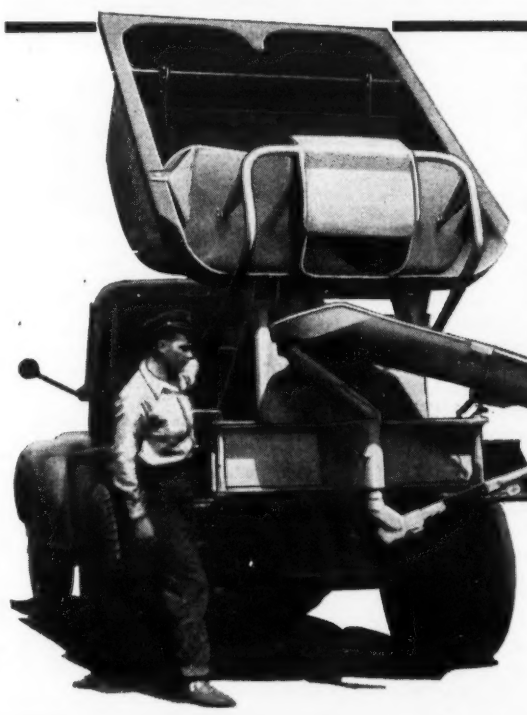
C. & E. M. Photo

A Northwest Model 18 crane drives steel sheet piling to protect the banks of a new roadbed from wave wash along Bayou Lafourche in southern Louisiana. This photo shows also a completed portion of the new clamshell base course T. L. James & Co. laid on State Route 620.

After the grader had spread the material evenly, traffic experienced no difficulty such as getting bogged down in the clamshells. Equipment rolling of this first course also proved to be un-

(Concluded on next page)

Today the DUMPCRETE is hauling concrete in 34 states, Canada, Hawaii



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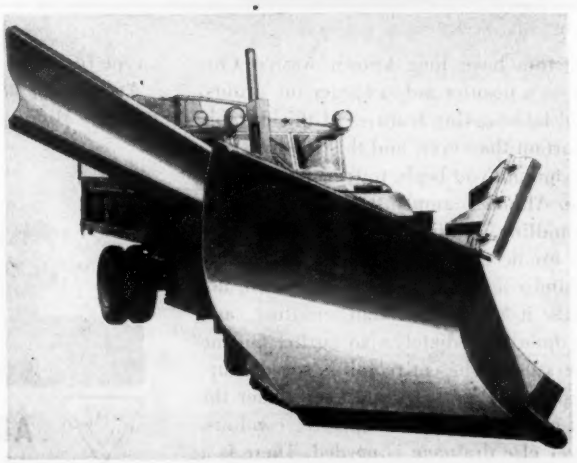
SNOW REMOVAL and ICE CONTROL WITH BURCH EQUIPMENT

The BURCH "TILT-LEV" under-truck blade offers an all purpose maintainer especially suitable for ice removal. The high degree of operator control (all hydraulic) makes it excellent for general road and ditch maintenance. Fits any standard, heavy-duty truck.



Illustrated is one of the many plow and wing combinations which are designed to hitch onto all trucks and tractors. The "SNO-FLO" moldboard design provides for speedy, efficient snow removal. It's the result of years of experience in building ROSS plows.

THE BURCH CORPORATION

SINCE 1875

Crestline, Ohio

Dredged Clamshells Used As Base Course

(*Continued from preceding page*)

necessary as good compaction was obtained from traffic, especially with the heavy trucks from the oil fields, and the big transport vans from the fish-canning factories.

The upper 5-inch course, however, was spread by the grader half the width of the roadbed at a time, while traffic was maintained on the other half. The usual procedure was to work along half the road one day, and then finish the adjoining half on the following day. A Buffalo-Springfield 10-ton 3-wheel roller compacted the top layer. The shells were kept well watered. A 1,000-gallon tank mounted on a Ford truck sprayed the base course from a 10-foot bar at the rear through a gravity flow. Water for the tank was pumped from the bayou by a Gorman-Rupp 2-inch pump which was carried at the rear of the truck.

The blading, watering, and rolling process was continued until the clamshell base course was thoroughly compacted and shaped to grade. An average of 800 cubic yards of base course was laid in place in a 9-hour day, and the entire 9-mile section was completed by the middle of last December.

Sheet-Pile Protection

The contractor used the winter months for driving 4,543.6 linear feet of steel sheet piling along the bayou bank where caving had occurred. In several sections, parts of the sloping roadbed had eroded and disappeared into the bayou because of the wave wash set up by the passage of large fishing-fleet boats. At this point the bayou is 150 feet wide and 12 feet deep. The sections of bank that had been subject to cave-in ranged from a minimum of 60 feet to a stretch of 4,500 feet, along which the piling was driven.

Corrugated interlocking steel sheet piling, No. 8 gage, with a 14-inch section and a 10-foot length, was shipped from New Orleans to Raceland via the Southern Pacific railroad. There it was unloaded to a Trailmobile trailer pulled by a White truck. The average haul to the project was 40 miles. The piling was driven by a Northwest Model 18 crane with a 30-foot boom and a 700-pound drop hammer working in 18-foot steel leads. Hanging from the bottom of the leads was a template made of two 10-foot sections of pipe, 6 inches apart, to keep the row of piling in line as it was being driven.

From 25 to 30 blows of the hammer were required to drive each pile to within a foot of grade, or 6 feet of penetration. For the final foot of driving, the drop hammer was removed and an air hammer, powered by a Le Roi portable air compressor, was used because of the greater precision that could be obtained to reach the exact grade. A 3-man crew, consisting of a crane operator and two laborers, drove an average of 200 linear feet of piling in a 9-hour day.

Holes were burned in the sheet piling with an oxyacetylene torch wherever drainage pipes crossing under the road discharged into the bayou. At low tide the upper part of the steel extending above the surface of the water was given a coat of asphalt paint. This was applied by a spray gun at the rate of 1 gallon to 400 square feet of surface.

To stiffen the piling, a continuous 4 x 4 x 5/16-inch angle was bolted along the top. Then a ¼-yard dragline bucket was attached to the crane and a slight cut, not exceeding 3 feet below the top of the piling, was made along the bayou side of the barrier. This excavated material was then dumped along the land side of the piling to replace the embankment that had been washed away. The line of sheeting is 25 feet from the center line of the road.

Quantities and Personnel

The cost of the base course and piling was $208,587.60. The major items included in the contract were as follows:

Excavation	2,856	cu. yds.
Clamshell base course	49,565	cu. yds.
Steel sheet piling	4,543.6	lin. ft.

An average force of 20 men was employed by T. L. James & Co. under the supervision of Henry Spohrer, Superintendent. For the Louisiana Department of Highways, J. H. Nickelson was Senior Project Engineer. The Department is headed by P. A. Frye, Director, with N. E. Lant, Chief Engineer; R. B. Richardson, Construction and Maintenance Engineer; and Lester Corley, District Engineer, with headquarters at Marrero, La.

Lightweight Engine

A portable 4-cycle air-cooled gasoline engine is made by the Aerolite Engine Co., Inc., Bayonne, N. J. The Aerolite engine is designed and built to fill the need for a lightweight all-purpose engine, its manufacturer explains. It is said to be easy-starting, to have improved cooling, and to weigh 59 pounds.

According to the manufacturer, the Model A 7.5 will develop 7.5 hp at 3,200 rpm. It has self-locking adjustable valve tappets and a waterproof magneto with impulse coupling. The connecting rods and removable cylinder head are made of a heat-treated aluminum alloy. The tank will hold 2 gallons of fuel. An enclosed unit plate clutch can be furnished as extra equipment.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 31.

Tools to Make Tote Box

A 4-page catalog has been issued by Merrill Bros., 56-04 Arnold Ave., Maspeth, N. Y. Subject of the folder is the Volz-O'Brien combination of tools for converting steel drums into tote boxes.

Discussed in the folder is the O'Brien steel drum-opening tool which works on a household-can-opener principle, and the Merrill-Volz grip clamp for lifting and transporting the steel drums. The folder tells how these tools can be used, discusses their safety features, and lists their sizes and prices.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 82.

DON'T GAMBLE WITH MANPOWER!

LENGTHEN THE WORKING SEASON WITH HERMAN NELSON PORTABLE HEATERS

ASSURE PRODUCTION BY:

SPACE HEATING of temporary buildings, storage sheds, repair shops, buildings under construction.

PREHEATING engines and all kinds of mechanical equipment.

SPOT HEATING of materials, workmen, machinery, storage tanks, tools.

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Your workmen are your greatest asset! Keep them going all winter with Herman Nelson Portable Heaters. These efficient units provide quick, clean, safe HEAT—where you want it—when you want it—without waste. Jobs go ahead faster, men are able to work better, schedules are more easily met—when Herman Nelson Portable Heaters are protecting against costly shutdowns due to cold. No bigger than a kitchen stove, this unit generates enough heat for three ordinary 5-room houses. And it's all done without smoke, soot or open flame!

Write for Interesting, Free Booklet on "Cost Control"

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SINCE 1906 MANUFACTURERS OF QUALITY HEATING AND VENTILATING PRODUCTS

J. W. Stang Wellpoint System

FOR SALE

Consisting of Wellpoint Pump, Jetting Pump with 300' 6" Header Pipe—130 Swing Joints, 125 Wellpoints, 1½" pipe, valves, etc. Almost new. Will sacrifice for quick sale.

Watkins-Aldridge Equipment Co.
Jackson, Mississippi

A Timely Tip

THAT SAVES CONTRACTING DOLLARS

Experienced contractors have long known ARMCO Corrugated Metal Pipe as a positive aid to bigger job profits. Today the time- and labor-saving features of this durable pipe are more important than ever, and this is why . . .

Savings start the minute you begin to transport ARMCO Pipe to the job site. Although amply strong it is light in weight for easy handling, loading and hauling. Fewer trips and less labor are needed. Long lengths are securely joined by simple band couplers. On the job a small, unskilled crew installs it quickly without cradling, and backfilling can be done immediately. No curing and no delays to other operations. The entire job is speeded up.

Let ARMCO Corrugated Pipe help you keep under the budget on that next contract. Use it for culverts, conduits, sewers, and wherever else drainage is needed. There is a type for every condition. Write for complete information. Armco Drainage & Metal Products, Inc., 2055 Curtis Street, Middletown, Ohio. Offices in principal cities.

ARMCO CORRUGATED PIPE

The Hystaway attachment for converting Caterpillar tractors to use as draglines, clamshells, or cranes is now made for the D8 as well as the D6 and D7.

Tractor Attachments

An attachment for converting Caterpillar tractors to use as draglines, clamshells, or cranes is made by the Hyster Co., 2902 Clackamas St., Portland 8, Oreg. Formerly made for the D6 and D7 tractors, the Hystaway attachment is now also available for use on the D8.

The basic Hystaway unit is attached to the track-type tractors by means of an attachment group for the specific model. Attachment groups are also made for fitting the unit to wide-gage tractors and to those with additional attachments. Specifications call for a ½-cubic-yard bucket on the D7 and D8, and a ⅜-cubic-yard bucket on the D6. Counterweights are available for tractors used without bulldozers.

While adding the functions of a dragline, clamshell, and crane to a Caterpillar track-type tractor, the Hystaway does not prevent its use for bulldozer or drawbar work. It can be removed in one hour or mounted in two, following the initial installation.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

Herringbone-Gear Reducer

Information on its herringbone-gear units for speed-reducing and speed-increasing service is offered in a new 68-page catalog of the Link-Belt Co., 307 No. Michigan Ave., Chicago 1, Ill. These units are made in sizes ranging from ½ to 1,000 hp, for use with electric motors, steam turbines, and gasoline or diesel engines.

Engineering information in Book No. 1819 includes reducer-selection data and examples of proper application; dimensions and horsepower ratings; lubrication data; and tables of maximum allowable pull on high and low-speed shafts. The book also contains several pages of photographs showing a great variety of installations. Gear-type flexible-roller-chain types of shaft couplings are listed and described. There is also a page of detailed information on the Link-Belt differential back-stop.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 89.

Data on Mower Tractors

A line of tractors for highway mowing operations is described in a catalog issued by the Worthington Mower Co., Stroudsburg, Pa. Known as the Chief, this tractor will attain speeds of up to 47.5 mph. It is made in two models: the Airfield Chief, recommended by the manufacturer for high-speed cutting, and the Golf Chief, which features an oscillating front axle for use in hilly terrain.

The catalog shows both models and illustrates individual features, such as the hydraulically controlled E-Z ride seat, the conveniently placed tool and battery box, and others. The folder also contains a detailed list of specifications for the Chief.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 88.

District Mgrs. for Murphy

The Murphy Diesel Co. of Milwaukee has announced the appointment of Alexander M. McDougall as District Sales Manager for the New England states. At the same time announcement is made of the appointment of F. R. Meyers as District Sales Manager for the state of Missouri, for eastern Kansas, and for southwestern Illinois.

Cabl-Ox Clamp Rights Sold

Exclusive manufacturing and merchandising rights to the Cabl-Ox wire-rope clamp, Cabl-vise, and allied wire-rope products have been purchased by the Cabl-Ox Corp., 6 No. Michigan Ave., Chicago 2, Ill. These products were originally made by the Nunn Mfg. Co., Evanston, Ill.

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS

ACCURATE...DEPENDABLE...ECONOMICAL—Reduce labor costs, save time, minimize maintenance with an Etnyre "Black-Topper". Covers roads up to 24 feet wide in one trip...low-cost operation...accurate and dependable. See your Etnyre dealer or write us today for complete details.

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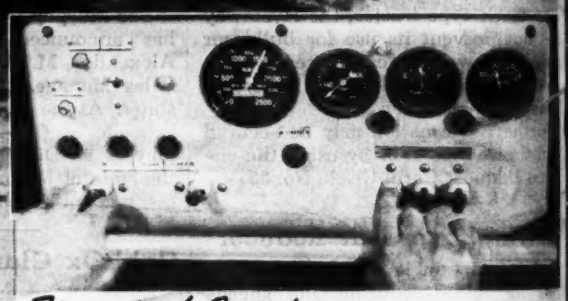
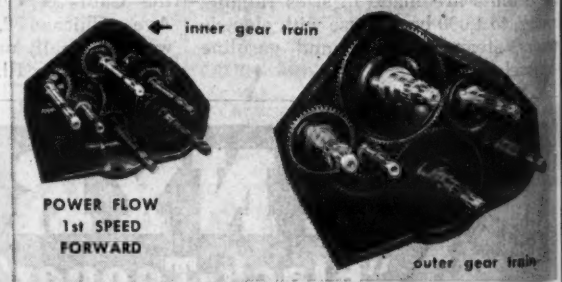
Contractors and Engineers Monthly

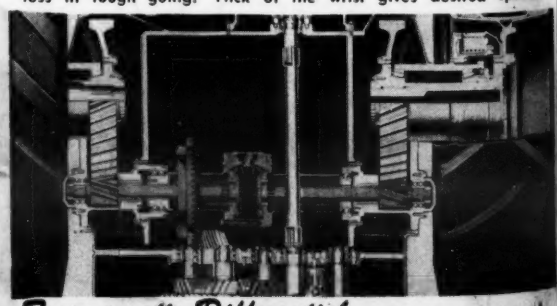
Here's why new high-speed *TOURNAPULLS* cut delays from mud, sand and weather



Finger-touch Control — The movement of a finger on a switch controls every phase of the load, haul and spread cycle. Powerful Tournatorque electric motors steer the Tournapull, control the depth of cut, activate the positive ejection tailgate.



Tournamatic Transmission — Constant mesh transmission saves time and energy. No time wasted in shifting gears . . . no foot clutch to bother with . . . no momentum loss in tough going. Flick of the wrist gives desired speed.



Tournamatic Differential — Controls amount of power delivered to each drive wheel, prevents wheel spin if traction is lost. If one drive wheel loses traction, up to *four* times as much, power automatically transfers to other wheel.

TOURNAPULLS "walk" through deep mud, soft sand, sticky clay . . . haul fast over surface slippery with ice or snow . . . without delays. These *four* exclusive features keep Tournapulls working longer in adverse weather and tough job conditions.

1 EXTRA FLOTATION AND TRACTION—giant rubber tires provide plenty of surface contact . . . tapered bead permits extra low pressures for additional flotation, keeps tire firmly seated against rim. Heavy-duty, specially designed tread grips the ground . . . rugged construction resists the wear and tear of tough going.

2 INSTANTANEOUS SPEED SELECTION—constant mesh Tournamatic transmission gives uninterrupted power flow to drive wheels. No time lost shifting . . . no loss of momentum . . . more power *instantly* to keep you out of trouble . . . a flick of the wrist gives immediate change of pace to any of four forward and two reverse speeds.

3 POWER PROPORTIONATING DIFFERENTIAL—Tournamatic differential transmits the *most* power to the wheel with the *most* traction. A Tournapull wheel doesn't spin in mud holes or in other loose or slippery materials because other wheel automatically takes over job of moving rig in desired direction. This revolutionary feature gives up to *four* times as much pull to wheel on firmest footing.

4 POSITIVE POWER STEER — Tournapull goes just where operator wants it . . . without fighting clutches, brakes or steering wheel . . . a finger-touch switch gives and holds exactly the angle of turn required — up to 90 degrees, right or left. Powerful electric motor turns prime mover even in deep mud or sand giving fresh traction at all times to pull through in all kinds of weather.

See your LeTourneau Distributor NOW for complete information

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Tournatorque, Tournamatic — Trademark

LETOURNEAU PEORIA, ILLINOIS — HIGH-SPEED RUBBER-TIRED **TOURNAPULLS**